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INNOVATIVE APPROACHES OF OCULAR DRUG FORMULATION & DELIVERY

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ABSTRACT

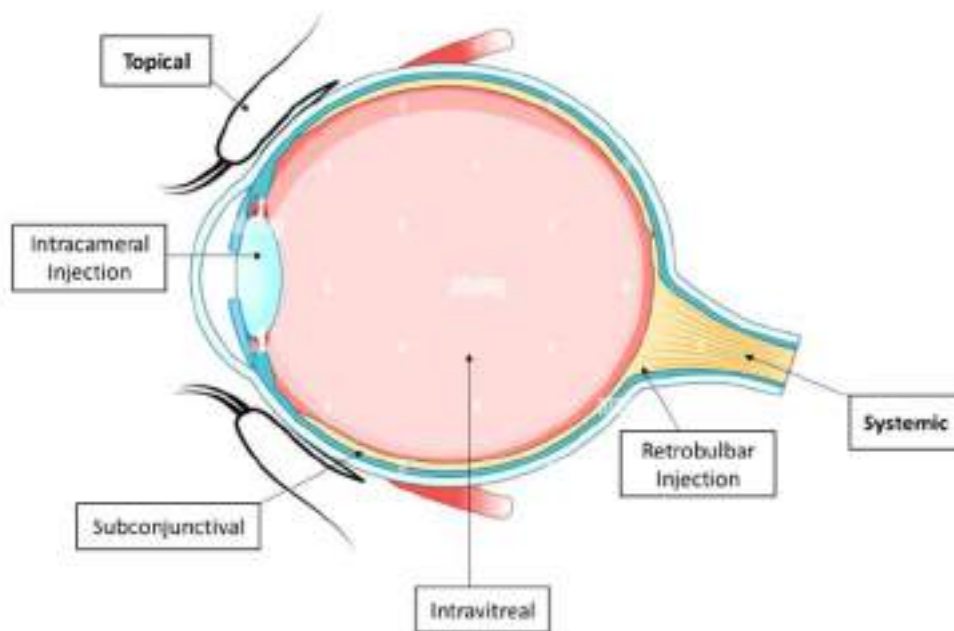
Ocular drug delivery has made significant progress not just for fast developing gene therapy items but also for pharmaceutical chemicals such steroids, non-steroidal anti-inflammatory medications, immune modulators, antibiotics, and so on. While the main considerations for achieving adequate treatment outcomes for conventional non-gene therapy drugs are appropriate surgical techniques and release systems, the scope of "drug delivery" for gene therapy drugs is further expanded to include vector selection, vector engineering, and transgene construct optimization. Because it has so many benefits, the eye is an especially good organ to target with gene therapy. We will examine three key areas of ocular drug delivery in this review, pertaining to both conventional drugs and Aden-associated virus (AAV)-based gene therapy products: (1) the creation of AAV vector systems for ocular gene therapy, (2) novel drug carriers, and (3) the evolution of administration routes.

KEYWORDS: Novel drug delivery system, approaches, conventional topical formulations, biotechnology.

INTRODUCTION

The ocular globe is a unique organic structure with remarkable physiological, histological, and anatomical characteristics. Generally speaking, there are two main segments of the ocular globe: the anterior and posterior regions. The anterior portion of the eye comprises the choroid, neural retina, optic nerve, retinal pigment epithelium, sclera, and vitreous humor. The posterior portion occupies the remaining second-third of the eye and is composed of the aqueous humor, conjunctiva, cornea, iris, a ciliary body, and a lens [1-3]. Numerous illnesses can be identified based on the area of the eye that was evoked. A variety of conditions might be referred to as cataracts, anterior uveitis, or conjunctivitis for the anterior portion of the eye. Other conditions including diabetic retinopathy and age-related macular degeneration impact the posterior region of the eye. As a result, treating eye disorders is difficult since it requires creating medications that are tailored to address various issues relating to obstacles found in the structure of the eye [4-6].

In the last ten years, new medication delivery strategies have been developed to treat debilitating eye illnesses by targeting particular ocular tissues. Of eye disorders, the posterior region represents the source in 55% of cases [7]. The most common causes of vision impairment are retinal diseases, which include retinitis pigmentosa (RP), endophthalmitis, viral retinitis, proliferative vitreoretinopathy (PVR), age-related macular degeneration (AMD), diabetic retinopathy (DR), diabetic macular edema (DME), and inherited retinal diseases (Birds) [8,9]. The presence of dynamic barriers, such as conjunctival and choroidal blood flow, tear turnover, and lymphatic clearance, as well as static barriers, which are different layers of the cornea, sclera, retina, blood-aqueous (BAD) and blood-retinal barriers (BRB), pose a challenge to treating these retinal diseases and delivering drugs to specific ocular tissues. In recent years, there has been a significant growth in the field of research on ocular "drug delivery," which encompasses several novel approaches to target a retinal tissue and overcome ocular obstacles. Certain medication properties, target sites, and disease types can all affect how a medicine is delivered [10]. Derivatizing active pharmaceutical constituents (API) and enhancing their optical bioavailability using a conflation as a carrier system is another innovative strategy. This tactic might lessen eye vexation and enhance API's goods. Shen et al. (25) tried to increase the flurbiprofen's conflation biocompatibility in order to test this proposition. Flurbiprofen axetil, an outgrowth of flurbiprofen, was prepared as a conflation in this study using castor oil painting and tween- 80(30). Four distinct mixes were made and named F1, F2, F3, and F4 consequently. They had variable rates of castor oil painting (0.1 weight percent to 2.5 weight percent) and tween 80(0.08 weight percent to 4 weight percent). manly New Zealand albino rabbits were used in in vivo trials using topical drop instillation. Pharmacokinetic analyses of waterless humor revealed F2 conflation (castor oil painting) [11].

**Fig no.1 Anatomy of the Eye**

In this mini-review, we try to concentrate on and highlight effective methods that have been documented in the recent literature and are based on novel approaches to get through the physiological and anatomical barriers of the vitreoretinal structures. We also discuss the difficulties in identifying relevant and appropriate therapies for safely and effectively administering therapeutic agents to retinal tissues [12].

Novel formulation approaches for Ocular Delivery of Proteins and Peptides

Biodegradable Polymeric Micro Particles/Microspheres: Proteins, peptides, and tiny molecules are typically delivered to the eyes for a week or more using microparticles or microspheres. When the biocompatible polymers that make up the microspheres break down, they produce monomers and other harmless byproducts that are eventually removed safely from the eye and the circulation. The most often utilized polymers are poly (lactic-co-glycolic acid) (PLGA), which has excellent encapsulation efficiency, sustained release, biocompatibility, and the capacity to break down into toxicological acceptable compounds that are removed from ocular tissues [13]. PLGA microspheres produced significant vancomycin concentrations (0.81 mg/ml) in the rabbit aqueous humor 180 minutes after topical application, according to Gavini and colleagues [14].

Biodegradable Polymeric Nanoparticles/Nanospheres: Liposomes, dendrites, micelles, and nanowebers are examples of nanoparticles that are actively employed as carriers for the targeted distribution of proteins, peptides, and small molecules. Nanoparticles are often made of biodegradable polymers and lipids. Similar to microparticles, drug release from nanoparticles is influenced by molecular mass, the pace at which polymers degrade, and other physicochemical parameters. There are several ways to give nanoparticles, such as topical, particular, suprachoroidal, and intravitreal. However, because polymeric particles scatter light, intravitreal injection frequently results in vitreous clouding. Due to their larger molecular mass, nanoparticles are more likely to cause vitreous clouding than microparticles, which tend to sink to the lower portion of the vitreous cavity. Additionally, reduced stability and potential loss of bioactivity of biopharmaceuticals [15]. By administering LPPR peptide, which binds exclusively to the VEGF receptor, NRP-1, as nanofibers, a team of researchers and B. Senturk (2016) have recently shown a considerable suppression of endothelial cell proliferation and migration as well as abnormal capillary formation. Additionally, on day 14, a subconjunctival injection of LPPR-PA nanofiber significantly reduced corneal neovascularization in a rat model (81.3%) in contrast to bevacizumab (51.2%), suggesting that it is a useful treatment for illnesses associated to angiogenesis [16].



Route	Benefits	Challenges	Use in the management of illnesses
Systemic/Oral	patient's complaint and the non-invasive administration method.	High dosage results in toxicity, BAB, BRD, and BA<2%	PU, CMV retinitis, scleritis, and episcleritis
Topical	High patient compliance, noninvasive, and self-administrable	Increased tera dilution and turnover rate, efflux pumps, corneal barriers, and BA, 5%	Blepharitis, conjunctivitis, uveitis, and keratitis
Intravitreal	Direct administration to the retina and vitreous maintains medication levels and avoids BRB	Patient noncompliance, endophthalmitis, cataract, and retinal detachment hemorrhage	AMD, CMV retinitis, PU, BRVO, and CRVO.
Intracameral	Increase the dosage levels of the medicine. decreases corneal and systemic adverse effects, and does away with the need for topical drops in the anterior chamber.	Both toxic endothelial cell destruction syndrome (TECDS) and toxic anterior segment syndrome (TASS)	Anesthesia, inflammation, pupil dilatation, and endophthalmitis prevention.

Table (1). Summary of Route of Administration, Benefits, and Challenges in Ocular Delivery.

OCULAR ROUTES FOR DRUG DELIVERY SYSTEM

Conventional Topical Formulations

Eye Drops: The eye drop formulations have several characteristics that make them a commonly prescribed form. They are non-invasive, safe, act right away when applied, have a high patient compliance rate, and are appropriate for the product. When eye drops are applied, the supported drug is absorbed through a pulsatile mechanism that happens after the drops are applied topically. This is followed by a rapid decline in drug concentration that roughly corresponds to a first order elimination process. By slightly disrupting the integrity of the stated tissue, the use of these chemicals is intended to increase the uptake by ocular tissues. Preservatives, cheating agents, bile salts, and surfactant molecules are just a few of the many substances that are said to have comparable qualities in this context and are used as permeation enhancers. The purpose of using these enhancers in an ocular solution is to significantly raise the compounds' bioavailability [17,18]. Studies conducted by Hornof et al. in 2002 revealed that polycarbophil-cysteine, a chemical used as an excipient, did not alter the tissue structure of the eye and was deemed safe enough to be employed in formulations for ocular route distribution [19].

Emulsions: A aphasic system made up of two immiscible phases is called an emulsion. Ophthalmic emulsions have the potential to increase the bioavailability and solubility of medications that were previously water-insoluble. Water in oil and oil in water (o/w) are two broad categories into which pharmaceutical emulsions can be divided. The o/w system, which comprises of a hydrophobic medication combined with oil and distributed in an aqueous media, is commonly used in ophthalmic formulations. Because of its exterior aqueous phase, an o/w emulsion has reduced ocular irritation and greater ocular tolerance than a water-in-oil emulsion [20,21]. Ophthalmic eye drops that are commercially available include Duel (Alton), Parasite (Akron), Refresh Endure (Allergan), and Restasis (Allergan) [22]. To lessen the impact on intraocular pressure in rabbits, Muchtar and associates created a submicron emulsion as an ocular carrier for delta-8-tetrahydrocannabinol because of the drug's poor solubility [23].

Suspension: Finely split insoluble drug particles suspended in an aqueous media with dispersing and solubilizing agents make up ocular suspensions. Drug particles are suspended in the precorneal cavity, lengthening the drug's duration of contact. The length of time needed for the drug molecules to absorb into a corneal tissue is determined by the medication's particle size, which ultimately affects the drug's bioavailability. For bacterial eye infections, Alcon, Inc.'s TobraDex ST suspension (0.3%) tobramycin and (0.05%) dexamethasone is recommended (Spiral.,2008) [24].

Ointments: Ointments fall under the category of topical formulations and are also utilized as drug delivery carriers. Because the composition of these systems is based on a mixture of solid and semisolid hydrocarbon molecules, their typical melting points are close to the ocular temperature of 34°C. However, which hydrocarbon should we select for a particular use? This detail makes a big difference in a formulation's biocompatibility because the substance can't be rejected by the body to stop more organic side effects or even to ensure that the formulation's goals of increasing the drug's bioavailability and sustaining the delivery process are carried

out [25,26]. In 2003, Fukuda and associates aimed to investigate the dynamics of vancomycin hydrochloride produced as ophthalmic ointments in the rabbit eye's internal environment, connecting this phenomenon to the MRSA extraocular infection. The researchers employed a control group of rabbits and an experimental group infected with *Bacillus subtilis* to ascertain the lowest concentration that prevents the growth of MRSA in bacterial infections. The latter group was created by injecting a *Bacillus subtilis* solution intracorneally into the parenchyma's central region. The previous parameter had a range of 1.56 µg/g [27].

Biotechnological Inspired Drug Technology:

Domicile: Colloidal drug delivery vehicles called Nano micelles self-assemble in aqueous solutions in an instant. Because of their hydrophilic surface, nanomicelles are perfect for delivering hydrophobic medications to the eye because they extend the duration of drug retention. Surfactant and polymeric nanomicelles are two broad categories for nanomicelles. Generally speaking, surfactant nanomicelle aggregates are weak and prone to physical instability upon dilution, whereas polymeric micelles are known to be more stable [28]. Panda et al. (2013) revealed that dipeptidic phenylalanine- α and beta-hydroxyphenylalanine nanotubes were used as carriers to successfully administer pazopanib intraocularly. Using an intravitreal injection, the preparation produced a 15-day sustained pazopanib concentration in the vitreous, retina, RPE, and choroid [29].

Dendrimers: Synthetic polymers are arranged in branched and layered structures called dendrites, which have potential applications as nanocarriers in various biomedical fields. Compared to linear polymers, dendrites have entirely different properties due to their distinct branched topologies. G-1, G-2, and G-3 dendrites can be classified according to their size, number of branches, and end groups at the terminal. Any kind of polymer can make up a dendrites, and this will affect the material's solubility, stability, and biological activity. Polyamidoamines, polyamines, polyamides (polypeptides), poly (ARL ethers), polyesters, carbohydrates, and DNA are some of the frequently used dendrites. Of these, dendrites based on polyamidoamine (PA MAM) are the most widely used and commercially accessible. The multiagent characteristic of dendrites, in contrast to linear polymers, offers a way to achieve high concentrations of payloads, such as small molecules and biopharmaceuticals [30]. In order to investigate the impact of drug-release kinetics following modifications to the PAMAM dendrimer's size, molecular weight, carboxylate and hydroxyl surface groups, and total amount of amines, Vandamme and Brobeck (2005) trapped tropicamide and pilocarpine nitrate within the dendrimer. Results obtained in vivo in albino rabbits from New Zealand showed that dendrimers functionalized with carboxylic and hydroxyl functional groups have longer drug residence times [31].

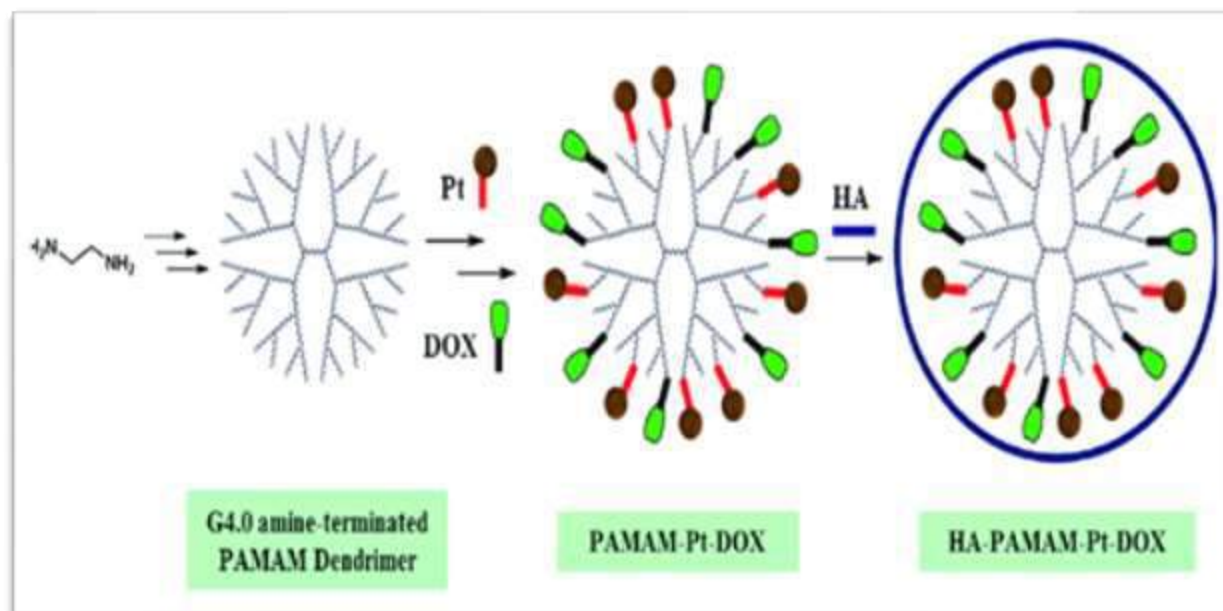


Fig no.2 Diagram showing how PAMAM dendrimers are made, with two medications (Pt and DOX) covalently bonded to the amine groups of the dendrimer's outer generation. The dendrimers' biocompatibility is enhanced by the addition of an external layer of HA, which is synchronized through electrostatic interactions with PAMAM [32]

Nano wafers: Nano wafers are small, transparent, circular discs made of different polymers, such as carboxymethyl cellulose (CMC), poly (vinyl alcohol) (PVA), polyvinylpyrrolidone (PVP), and (hydroxypropyl)methyl cellulose (HPMC). Unlike a topical eye drops, these can endure continuous blinking without becoming dislodged when applied with the fingertip on the ocular surface. Nanowebers are made up of arrays of drug-loaded nanoreservoirs that release the cargo over a few hours to several days under strict supervision. The polymers and the loaded medicine work in concert to produce a gradual release of the drug, which lengthens its residence time in the ocular tissues and improves its absorption. Crucially, the nanoweber disappears and dissolves at the conclusion



of the prescribed medication release period, leaving the ocular surfaces free of polymers [33]. A dexamethasone-loaded nanowafer (Dex-NW) was created by Coursey et.al in 2015 and Bianetal in 2016 to treat dry eye condition. The carboxymethyl cellulose polymer was used to create the nanowafer, which was made up of many nano drug reservoirs that were loaded with dexamethasone. A mouse model of dry eye illness was used to investigate Dex-NW's in vivo effectiveness. For five days, Dex-NW was given as a once-daily therapy on alternate days [34].

Liposomes: Liposomes are spherical vesicles that self-assemble from cationic lipids. They have an aqueous core that can include hydrophilic particles, including tiny molecules, biologics, and DNA. Via either endocytosis or phagocytosis, liposomes enter the cell. As the endosome changes into a lysosome through the clathrin-mediated endoscopic pathway, endosome constituents are typically broken down. However, by selectively becoming cationic at a low pH (such as inside lysosomes), the usage of pH-dependent cationic lipids can aid escape from endosomes following endocytosis. In order to increase the vesicles' effectiveness of release, triggers like light, pH, heat, and ultrasonic waves have been employed recently to break the lipid bilayer of the vesicles [35]. Products like Tears Again® and Visudyne® (2017, 2018) are excellent examples of these formulations that are now on the market for the treatment of eye conditions. In contrast to isotonic saline solutions and triglyceride gels, the first product, a spray composed of phospholipid-based liposomes, has effectively shown clinically significant benefits for treating dry eye diseases [36].

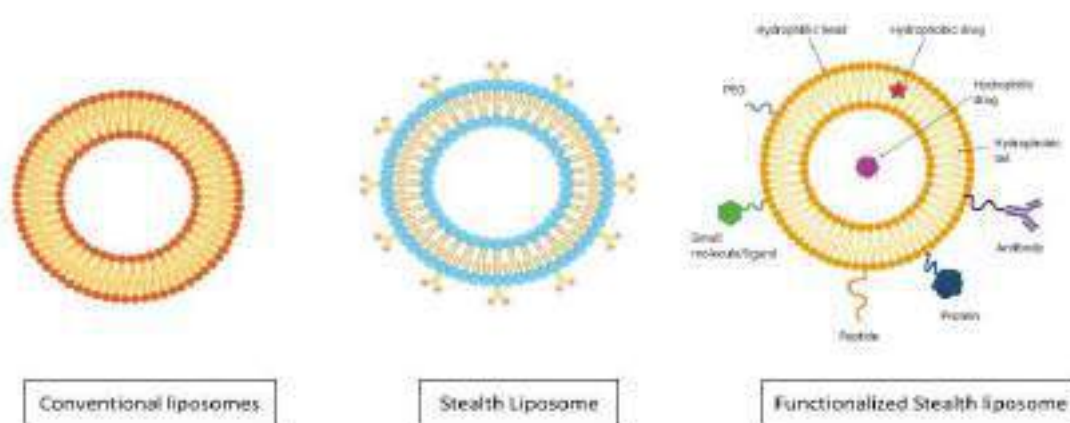


Fig no.4 Phospholipids in an aqueous solution from a liposome [37].

CONCLUSION

For many years, ophthalmologists have faced the difficulty of effectively delivering drugs into the eyes. The immunological privilege, accessibility, and compartmentalization of the eye still make it a great prospect for gene therapy research, despite the challenges. The field of drug delivery has increased with the research of viral and non-viral-based vector administration, spurred by the rise in the development and availability of gene therapy products. While there are benefits and drawbacks to both viral and non-viral vectors, Aden-associated viruses (AAV) are currently the subject of much research in the field of ocular medication administration. ATVs are effective at transducing RPE cells and photoreceptors (PRs), and future research should aim to reduce immunogenicity while increasing capacity. Ocular vector technology and carrier system technology have advanced [38].

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HERBAL DRUGS: ROLE IN THE TREATMENT OF CANCER

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ABSTRACT

Cancer encompasses a collection of diseases marked by the unrestrained growth and spread of abnormal cells. When this growth unchecked, it may lead to tumors, harm to bodily tissues, and the dissemination (metastasis) to various other areas of the body. There are numerous cancer types, such as breast cancer, lung cancer, prostate cancer, skin cancer, each different regions. Typically, cancer originates from genetic mutations that interfere with normal cellular regulation, prompting cells to multiply uncontrollably. These mutations may be inherited, triggered by environmental influences (including smoking, radiation, or exposure to cancer-causing agents), or they can occur spontaneously. Treatment alternatives vary based on the cancer type and stage, potentially involving surgery, chemotherapy, radiation therapy, immunotherapy, and targeted therapies. Detecting cancer early through screenings can significantly enhance the prospects for effective treatment. Synthetic drugs for cancer therapy aim to precisely focus on cancer cells, prevent tumor advancement, or enhance the body's immune system in combating the disease. Herbal medicines, sourced from natural plants, have been utilized in traditional medicine for centuries and are increasingly recognized in contemporary healthcare due to their potential healing properties. These natural substances provide a broad array of pharmacological advantages, such as antioxidant, anti-inflammatory, antimicrobial, and anticancer effects. Their capacity to influence various biological pathways makes them essential in managing intricate conditions, including cancer, heart diseases, and neurodegenerative disorders.

KEYWORDS: *Cancer, Herbal drugs, Treatment.*

INTRODUCTION

The growing burden of cancer globally underscores the need for novel, effective, and safer treatment options. Herbal drugs, derived from medicinal plants, have emerged as a valuable resource in cancer therapy due to their diverse bioactive compounds with anticancer, antioxidant, and anti-inflammatory properties. These natural agents act through mechanisms such as inducing apoptosis, inhibiting angiogenesis, modulating immune responses, and suppressing cancer cell proliferation. Unlike conventional therapies, herbal drugs often exhibit lower toxicity and fewer side effects, making them attractive as complementary or alternative treatments [1].

Medicinal plants have been essential to healthcare for centuries and have formed the basis of many contemporary pharmaceuticals. Recently, there has been a growing interest in plant-based treatments for cancer due to an increasing desire for alternative and complementary medicine options. Cancer, known for its complexity and varied nature, often necessitates treatments that are both effective and cause fewer side effects. Numerous medicinal plants possess bioactive compounds with properties that combat cancer, such as alkaloids, flavonoids, and terpenoids, which have demonstrated effectiveness in slowing cancer cell proliferation, promoting apoptosis, and hindering metastasis. Ongoing research is investigating these natural compounds for their potential to improve standard cancer therapies or act as independent treatments. As the quest for safer and more effective cancer treatments progresses, medicinal plants continue to be a vital asset in oncology studies. This review intends to emphasize significant medicinal plants that are utilized in cancer treatment and the mechanisms through which they operate [2].

Current Approaches for the Treatment of Cancer

The treatment of cancer has evolved significantly over the years, with modern approaches focusing on improving efficacy, precision, and patient quality of life. Current strategies include:

Surgical removal of tumors is often the first step for localized cancers. Advances in minimally invasive and robotic-assisted surgeries have enhanced precision and recovery outcomes.

High-energy radiation, such as X-rays or protons, targets and destroys cancer cells by damaging their DNA. Techniques like intensity-modulated radiation therapy (IMRT) and proton beam therapy improve accuracy and reduce side effects.

Chemotherapy uses cytotoxic drugs to destroy rapidly dividing cancer cells. It is often used in combination with other treatments but can lead to side effects such as nausea, fatigue, and immune suppression.



Targeted Therapy focuses on specific molecular targets involved in cancer cell growth and survival. Examples include monoclonal antibodies and small-molecule inhibitors, such as trastuzumab (for HER2-positive breast cancer) and imatinib (for chronic myeloid leukemia).

Immunotherapy enhances the body's immune system to recognize and attack cancer cells. Immune checkpoint inhibitors (e.g., pembrolizumab) and CAR-T cell therapy represent significant advances in treating certain cancers [3, 4].

Hormonal Therapy is used for cancers driven by hormones, such as breast and prostate cancer. Drugs like tamoxifen and aromatase inhibitors block or lower hormone levels to slow tumor growth.

Bone Marrow and Stem Cell Transplantation involves replacing damaged bone marrow with healthy stem cells, often after high-dose chemotherapy or radiation. This is used for blood cancers such as leukemia and lymphoma.

The integration of advanced technologies, such as artificial intelligence and genomics, continues to refine allopathic cancer treatments, making them more precise and patient-centric [5].

Limitations of Allopathic Approaches for the Treatment of Cancer

While allopathic treatments for cancer have significantly improved patient outcomes, they are associated with several limitations that can impact their effectiveness, safety, and accessibility:

Toxicity and Side Effects

Chemotherapy and Radiation Therapy: These treatments often damage healthy tissues alongside cancer cells, leading to side effects such as nausea, fatigue, immune suppression, hair loss, and long-term complications (e.g., secondary cancers).

Targeted and Immunotherapy: While more precise, they can still cause adverse reactions, such as immune-related side effects or organ inflammation.

Drug Resistance

Cancer cells can develop resistance to chemotherapy, targeted therapies, and immunotherapies, reducing their efficacy over time. This often necessitates a shift to alternative treatments, which may be less effective.

Incomplete Response

Not all patients respond adequately to standard treatments. Factors such as genetic heterogeneity of tumors and variations in individual biology can limit treatment success [6-8].

High Costs and Accessibility

Advanced therapies like CAR-T cell therapy, proton beam therapy, and precision medicine can be prohibitively expensive, limiting access for many patients, especially in low-resource settings.

Risk of Recurrence

Some treatments may not eliminate all cancer cells, leading to a risk of recurrence. This is particularly challenging in aggressive or metastatic cancers.

Limited Efficacy for Advanced or Metastatic Cancers

Allopathic treatments are often less effective for cancers that are advanced or have spread extensively, where options are limited to palliative care or experimental therapies.

Potential for Over-treatment

In some cases, aggressive treatments may be used even when the expected benefits are minimal, leading to unnecessary side effects and reduced quality of life.

Resistance to Immunotherapies

Some tumors evade immune system detection or create an immunosuppressive microenvironment, making immunotherapy less effective.

Long-term Health Risks

Treatments like radiation and chemotherapy can lead to chronic health problems, such as cardiovascular issues, infertility, or secondary malignancies, long after the treatment ends [9, 10].



Importance of Herbal Drugs

Herbal medicines have garnered significant attention in the field of cancer, primarily due to their ability to offer therapeutic benefits with fewer adverse effects compared to standard chemotherapy and radiation therapies. The active compounds present in various herbs, including flavonoids, alkaloids, saponins, and terpenes, showcase a range of pharmacological properties, such as anti-inflammatory, antioxidant, and anti-tumor effects. These compounds can block cancer cell growth, trigger apoptosis (the process of programmed cell death), impede angiogenesis (the creation of new blood vessels that nourish tumors), and diminish metastasis (the distribution of cancer cells to other parts of the body).

Numerous herbal treatments function by influencing molecular pathways that play a role in cancer development. For instance, curcumin (derived from *Curcuma longa*), resveratrol (found in grapes), and epigallocatechin gallate (EGCG from green tea) have shown the capacity to disrupt cell signaling pathways that are essential for the survival and multiplication of cancer cells. Furthermore, particular herbal solutions can enhance immune system activity, aiding the body in identifying and eliminating cancer cells more efficiently.

Herbal drugs are often used in combination with conventional treatments to enhance efficacy, reduce toxicity, and improve the quality of life for cancer patients. While some herbs are being integrated into modern oncological practices, ongoing research and clinical trials are necessary to validate their effectiveness and ensure safety. In the future, herbal drugs may play an even more prominent role in integrative cancer therapy, offering new avenues for treatment and prevention [11].

Merits of Herbal Drugs

Herbal drugs are rich in bioactive compounds such as alkaloids, flavonoids, terpenoids, and polyphenols, which have been shown to possess anti-cancer properties. These compounds can inhibit cancer cell growth, induce apoptosis (cell death), and prevent the spread (metastasis) of tumors.

Compared to conventional chemotherapy and radiation, herbal drugs tend to have lower toxicity. Many cancer treatments cause severe side effects such as nausea, fatigue, and organ damage. Herbal drugs often provide a gentler alternative or complement by targeting cancer cells while sparing healthy tissue [11].

Herbal drugs often act on multiple biological pathways simultaneously, which can be beneficial in treating cancer, a disease known for its complex mechanisms. For example, they can inhibit tumor growth, reduce inflammation, suppress angiogenesis (formation of blood vessels in tumors), and boost immune response [12].

Herbal compounds can work synergistically, meaning that when combined, their therapeutic effects are enhanced. This property is often used to develop multi-component herbal formulations that may be more effective than single-compound treatments.

Many herbs have been found to have chemo preventive properties, meaning they can help in preventing the initiation, promotion, and progression of cancer. By neutralizing free radicals and reducing oxidative stress, herbal drugs can minimize DNA damage and the risk of mutations that lead to cancer [13].

Herbal drugs are also used in palliative care to improve the quality of life for cancer patients. They can alleviate side effects of conventional treatments (such as nausea, pain, and fatigue), enhance physical well-being, and support emotional health.

Herbal drugs are often more affordable compared to modern pharmaceutical treatments, making them accessible to a broader range of patients, especially in developing countries where traditional medicine is more prevalent.

Some cancer cells develop resistance to conventional chemotherapy drugs. Certain herbal compounds have been found to help overcome this resistance by altering cellular mechanisms, potentially making cancer treatments more effective over time.

Herbal drugs offer a promising and holistic approach to cancer treatment by providing natural compounds with therapeutic effects, fewer side effects, and the ability to target multiple mechanisms involved in cancer progression. Their integrative use alongside conventional treatments continue to be an area of active research [14-16].

**Table no.1: List of medicinal plants used for the treatment mitigation and prevention of cancer**

Sr. no.	Plant	Phytochemical	Anticancer activity into the chemical compound
1	Adiantum venustum	Terpenoids, Flavonoid	Reduction in lipid peroxidation
2	Aloe vera	Aloin	Inhibition of human neuroectodermal tumors
3	Heart-leaved moonseed	alkaloids, glycosides, steroids,	antiproliferative
4	Zingiber officinale	6-gingerol and 6-shogaol	inhibit the activation of NF-κB and MAPK signalling
5	Turmeric	Curcuminoids	inhibiting cell proliferation promoting cell apoptosis

DETAILS REGARDING THE HERBAL PLANTS**Adiantum Venustum**

Kingdom	Plantae
Family	Pteridaceae
Subfamily	Vittarioideae
Class	Polypodiopsida
Division	Tracheophyta
Species	Venustum
Order	Polypodiales
Genus	Adiantum

Anti-Cancer Activity

Induction of Apoptosis: Certain compounds may trigger programmed cell death in cancer cells while sparing normal cells.

Anti-inflammatory Effects: Reducing inflammation can lower the risk of cancer progression, and compounds in the fern may contribute to this effect.

While preliminary findings are promising, more extensive studies, including clinical trials, are needed to fully understand the anticancer potential of *Adiantum venustum*. Investigating its active compounds and mechanisms will be crucial for validating its use in cancer therapy [17].

Aloe Vera

Kingdom	Plantae
Family	Asphodelaceae
Subfamily	Asphodeloideae
Class	Liliopsida
Division	Magnoliophyta - Flowering plants
Species	Succulen
Order	Asparagales
Genus	Aloe

Anti-Cancer Activity

Aloe-emodin inhibited the proliferation of Merkel Cells Carcinoma to a significant degree and has also anti-neuroectodermal tumour activity in vitro and in vivo. Anthraquinones are involved in induction of death of human cancer cells in many studies. In Egypt, it was demonstrated that the extracts of *Aloe Vera* could have anti-hepatocarcinogenic effect through modulation of apoptosis [18, 19].

Heart-Leaved Moonseed

Kingdom	Plantae
Family	Menispermaceae
Class	Magnoliopsida
Species	Cordifolia
Order	Ranunculales

Anti-Cancer Activity



Cancer is one of the main reasons for death among women all around the world. In a study, HCl extract of *T. cordifolia* roots was exposed to liver and extra hepatic organs of rats, at concentration levels of 50 and 100mg/kg of body weight. A significant increase in Glutathione and other metabolizing enzymes levels was observed. Furthermore, malonaldehyde (MLD) level was decreased. In another study, the effect of *T. cordifolia* hexane extract on rats having Ehrlich ascites tumor was examined. Inhibition of proliferation of tumor cell (G1 phase) was observed and at the same time the 'Bax' gene expression was enhanced. The anticancer properties of secondary metabolites including yangambin, palmatine and magnoflorine extracted from *T. cordifolia* were tested in different types of tumor cells. Palmatine and yangambin were highly effective against oral cancerous cells, while others were effective against colon cancer cells. Synthetic chemotherapeutic agents have adverse effects on health, which is not the case with *T. cordifolia*. Therefore, it can be used as a safe drug to cure cancer disease [20, 21].

Zingiber Officinale

Kingdom	Plantae
Family	Zingiberaceae
Subfamily	Zingiberoideae
Division	Magnoliophyta
Order	Zingiberales
Genus	Zingiber

Anti-Cancer Activity

Activation of Caspases

Ginger compounds can activate caspases, a family of proteases that play essential roles in programmed cell death. This activation leads to a cascade of reactions that ultimately result in cellular apoptosis.

Modulation of Bcl-2 Family Proteins

Ginger influences the expression of proteins in the Bcl-2 family, which regulate apoptosis. For example, it may downregulate anti-apoptotic proteins like Bcl-2 and upregulate pro-apoptotic proteins like Bax, promoting the release of cytochrome c from the mitochondria and triggering the apoptotic pathway.

Inhibition of NF-κB Pathway

Ginger can inhibit the nuclear factor kappa-light-chain-enhancer of activated B cells (NF-κB) pathway, which is often activated in cancer cells and promotes cell survival. By suppressing this pathway, ginger can enhance apoptosis.

Reactive Oxygen Species (ROS) Generation

Some studies suggest that ginger induces ROS production, which can lead to oxidative stress and damage cellular components, pushing the cells towards apoptosis.

Cell Cycle Arrest

Ginger can cause cell cycle arrest at various phases (often at the G0/G1 phase), which can lead to apoptosis. This arrest prevents cancer cells from proliferating and allows time for damaged cells to undergo programmed cell death.

Death Receptor Pathway Activation

Ginger may enhance the expression of death receptors (such as Fas) on the surface of cancer cells, facilitating the extrinsic apoptotic pathway that is triggered by ligands binding to these receptors [22-24].

Turmeric

Kingdom	Plantae
Family	Zingiberaceae
Subfamily	Zingiberoideae
Class	Liliopsida
Division	Angiosperm
Order	Zingiberales
Genus	Curcuma

Anti-Cancer Activity

Inhibition of Cancer Cell Proliferation

Cell Cycle Regulation: Curcumin has been shown to arrest the cell cycle at different phases (G1, S, or G2/M) in cancer cells. By preventing cancer cells from dividing, curcumin can reduce tumor growth. This action is believed to occur through modulation of key regulatory proteins such as cyclins and cyclin-dependent kinases (CDKs), which control the progression of the cell cycle.



Downregulation of Oncogenes: Curcumin can suppress the expression of genes involved in the proliferation of cancer cells, such as Myc, K-ras, and EGFR (epidermal growth factor receptor) [25-27].

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UNLOAD FILES FROM SNOWFLAKE USING SNOWSQL

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ABSTRACT

Snowflake is a cloud-based, advanced data platform offered as a Software-as-a-Service (SaaS) [7] solution. It combines data storage capabilities—leveraging AWS S3, Azure, and Google Cloud—with the ability to handle complex queries and provide robust analytics. Snowflake stands out for its speed, flexibility, and user-friendliness compared to traditional databases and their analytics features. While Snowflake delivers data in near real-time, it does not operate in true real-time.

One key functionality is the ability to export data from Snowflake tables into external files using SnowSQL [1], its native SQL interface. This project aims to utilize SnowSQL to streamline data extraction from Snowflake, empowering users to efficiently retrieve data for analysis and reporting.

KEYWORDS: Snowflake, SnowSQL, SaaS, AWS

I. INTRODUCTION

Snowflake is a cloud-based data platform offered as a Software-as-a-Service (SaaS) solution. Designed to handle a wide range of data storage and analytical workloads, Snowflake leverages the infrastructure of major cloud providers like Amazon Web Services (AWS)[5], Microsoft Azure, and Google Cloud. It provides a highly scalable, secure, and cost-efficient environment for managing structured and semi-structured data. Snowflake's architecture separates storage and compute, enabling independent scaling for performance optimization and cost control. It supports complex querying, data warehousing, data lakes, and real-time analytics, making it a versatile solution for modern data challenges.

Key features of Snowflake include:

Separation of compute and storage: Enables cost-efficient scaling and resource allocation.

Support for structured and semi-structured data: Handles formats like JSON, Parquet, and Avro seamlessly.

Near real-time data processing: Allows quick access to processed data, though not in true real-time.

Built-in security and governance: Includes encryption, access control, and compliance with industry standards.

SnowSQL is Snowflake's native command-line interface (CLI)[3] used for interacting with the Snowflake platform. It serves as a powerful tool for executing SQL commands, managing database objects, and automating data operations. SnowSQL is particularly useful for loading data into Snowflake and unloading data from Snowflake tables to external systems or storage locations.

Key features of SnowSQL include:

Query execution: Allows users to run SQL queries to interact with Snowflake databases.

Data loading and unloading: Facilitates efficient movement of data into and out of Snowflake.

Automation: Supports scripting and batch operations for repetitive tasks.

Comprehensive options: Provides robust support for configuring file formats, compression, and partitioning during data unloading.

Cross-platform compatibility: Runs on multiple operating systems, including Windows, macOS, and Linux.

Together, Snowflake and SnowSQL form a powerful combination for organizations to efficiently manage and analyze their data, enabling streamlined operations and robust analytical capabilities.

II. OBJECTIVES

This project aims to comprehensively explore SnowSQL and its capabilities for querying, manipulating, and unloading data from Snowflake. It focuses on understanding Snowflake's key features, such as file formats, compression options, and staging areas, to optimize data extraction workflows. The implementation involves using SnowSQL to unload data into external storage systems, configuring settings like file format, compression, and partitioning to enhance efficiency. Additionally, it covers data transformation



and preprocessing to prepare data for analytics, effective management and distribution of unloaded files, and optimizing performance for scalability and resource utilization. Ultimately, the project demonstrates SnowSQL's effectiveness in data extraction, providing insights into improving data accessibility and enabling seamless integration with external systems for analytics and reporting.

III. DATA UNLOADING FROM SNOWSQL

Unloading data from Snowflake using SnowSQL involves extracting data from Snowflake tables and exporting it into external storage systems or file systems. This process is essential for data sharing, reporting, and integration with other analytical tools or pipelines. SnowSQL provides robust options for customizing the unload operation, ensuring efficient and optimized data extraction[8].

Steps for Data Unloading Using SnowSQL

1. Connect to Snowflake

Use SnowSQL to authenticate and connect to the desired Snowflake account and database

```
snowsql -a <account_name> -u <username> -r <role_name> -d <database_name> -s <schema_name>
```

2. Prepare the Unload Statement

Use the COPY INTO command to specify the source table and the destination for the unloaded data:

```
COPY INTO 's3://your-bucket-name/your-folder/'
```

```
FROM your_table_name STORAGE_INTEGRATION = your_storage_integration FILE_FORMAT = (TYPE = 'CSV'  
FIELD_OPTIONALLY_ENCLOSED_BY = '') HEADER = TRUE OVERWRITE = TRUE;
```

3. Run the Unload Command

Execute the SQL statement through SnowSQL:

```
snowsql -q "COPY INTO 's3://your-bucket-name/' FROM your_table_name ..."
```

4. Monitor and Validate the Unload Process

Monitor execution: Review the output logs from SnowSQL for status and performance metrics.

Validate files: Check the target storage location to ensure the files are unloaded correctly and match the expected format and size.

5. Advanced Configuration Options

Partitioning: Use partitioning to split large datasets into manageable chunks based on specified columns:

```
PARTITION BY (column_name)
```

Parallel Unloading: Use parallel processing for faster data unloading by enabling multiple worker threads.

Encryption: Leverage encryption for secure data transfer to cloud storage.

Optimize file size: Configure the MAX_FILE_SIZE parameter to balance file size and performance.

Use compression: Apply compression (e.g., GZIP) [11] to reduce storage costs and accelerate data transfer.

Secure storage integrations: Set up secure connections between Snowflake and external storage, such as Amazon S3, Azure Blob, or Google Cloud Storage, using storage integrations.

Log operations: Keep logs of unload operations for auditing and troubleshooting.

IV. COMPARISON: SNOWFLAKE VS. HIVE VS. TRADITIONAL DBMS

Snowflake, Hive, and traditional Database Management Systems (DBMS) differ significantly in their architecture[8], use cases, and operational capabilities. Below is a detailed comparison [9] of these systems across key dimensions:

1. Architecture

Feature	Snowflake	Hive	Traditional DBMS
Type	Cloud-native, fully managed	Data warehouse on Hadoop	On-premises or hybrid
Storage/Compute	Decoupled storage and compute for scalability	Storage tightly coupled with Hadoop HDFS	Monolithic architecture with integrated storage and compute
Cloud Support	AWS, Azure, Google Cloud	Deployable on Hadoop clusters, cloud-ready	Primarily on-premises; some support for cloud
Scalability	Auto-scaling; handles massive workloads	Scales with Hadoop cluster size	Limited to hardware capacity



2. Data Processing and Querying

Feature	Snowflake	Hive	Traditional DBMS
Query Language	Standard SQL	HiveQL (SQL-like)	SQL (varies by vendor)
Performance	Optimized for OLAP; fast and efficient	Optimized for batch processing	Optimized for OLTP; slower for OLAP
Workload Type	Analytical (OLAP)	Analytical (OLAP, big data)	Transactional (OLTP) and basic OLAP
Real-Time Processing	Near real-time data processing	Batch-oriented	Limited real-time capabilities
Concurrency	High concurrency with independent scaling of compute	Handles many users but depends on cluster	Limited by hardware and database design

3. Data Formats and Integration

Feature	Snowflake	Hive	Traditional DBMS
Supported Data Types	Structured, semi-structured (JSON, Avro, Parquet)	Structured, semi-structured, unstructured	Primarily structured
Big Data Support	Yes, with scalability	Native support via Hadoop ecosystem	Limited big data handling
Integration	Built-in integrations with BI tools and cloud storage	Integrates with Hadoop tools (e.g., Spark)	Limited, often requires custom connectors

4. Maintenance and Usability

Feature	Snowflake	Hive	Traditional DBMS
Management	Fully managed (no maintenance required)	Requires Hadoop cluster management	Requires significant manual maintenance
Ease of Use	Intuitive; no infrastructure knowledge needed	Requires expertise in Hadoop ecosystem	Relatively easy for small systems; complex at scale
Setup Time	Minimal; fast setup via SaaS model	Time-intensive Hadoop setup	Varies by vendor, often lengthy for enterprise

5. Cost Efficiency

Feature	Snowflake	Hive	Traditional DBMS
Cost Model	Pay-as-you-go for storage and compute	Lower costs but depends on Hadoop cluster	High upfront costs; licenses and hardware
Resource Utilization	Elastic; pay only for what you use	Utilization tied to Hadoop resources	Fixed resources; less flexible

6. Security and Compliance

Feature	Snowflake	Hive	Traditional DBMS
Security	Advanced security features (encryption, access control)	Relies on Hadoop security frameworks	Varies; generally robust for OLTP use cases
Compliance	Supports compliance standards like GDPR, HIPAA	Depends on cluster setup	Vendor-specific compliance

V. PROPOSED ALGORITHMS

1. Query Optimization

Snowflake automatically optimizes query execution to improve performance without requiring user intervention. Key aspects include:

Cost-Based Optimization: Uses metadata to determine the most efficient execution plan.

Adaptive Query Execution: Dynamically adjusts query plans based on workload and system conditions.

Result Caching: Stores query results to speed up repeated queries, reducing redundant computation.

2. Automatic Clustering

Automatic clustering eliminates the need for manual reorganization of data, a common task in traditional databases:

Dynamic Management: Snowflake automatically maintains the optimal clustering of data within micro-partitions based on access patterns.



No Manual Intervention: Unlike other systems, users do not need to actively manage clustering keys.

Improved Query Efficiency: Enhances query performance by maintaining logical data organization behind the scenes.

3. Micro-Partitioning

Snowflake uses micro-partitions, a proprietary data storage format, to achieve high performance and scalability:

Fine-Grained Data Storage: Data is divided into small, contiguous units called micro-partitions, each typically spanning 50–500 MB.

Metadata Management: Metadata about each micro-partition (e.g., column values, min/max ranges) is stored and used for rapid query pruning.

Automatic Data Optimization: Snowflake dynamically optimizes how micro-partitions are stored and accessed.

4. Data Sharing

Data sharing in Snowflake enables seamless collaboration without data duplication:

Secure Sharing: Shares data securely across accounts within the same cloud provider.

Live Data Access: Recipients access live data without requiring manual file transfers or extra storage.

Cross-Cloud Sharing: Supports data sharing across different cloud providers using Snowflake's interconnected architecture[6].

5. Concurrency Control

Snowflake employs robust concurrency control to support multiple simultaneous users and workloads:

Multi-Clustering: Automatically scales compute clusters to handle concurrent workloads without resource contention.

Isolation Levels: Provides ACID-compliant transaction support for consistent and reliable query results.

Optimized Performance: Handles mixed workloads (e.g., querying, loading) efficiently, ensuring minimal impact on performance.

VI. CONCLUSION

Unloading files from Snowflake using SnowSQL is a highly efficient and flexible process that facilitates seamless data extraction for analytical, reporting, and integration purposes. This paper demonstrated the capabilities of SnowSQL in simplifying the unloading workflow, from configuring file formats and compression to optimizing data extraction processes. By leveraging SnowSQL's robust features, users can automate and streamline data export tasks while maintaining scalability, security, and performance. The Key takeaways include the importance of proper configuration for file formats, compression, and partitioning, as well as strategies for performance optimization through parallel processing and resource management. Additionally, best practices for managing unloaded data files, including naming conventions, versioning, and distribution, ensure smooth integration with external systems. In conclusion, SnowSQL empowers users to unlock the full potential of Snowflake by enabling efficient, scalable, and secure data unloading processes. The insights provided in this paper highlight the significance of adopting SnowSQL for modern data extraction workflows, contributing to enhanced data accessibility, improved operational efficiency, and seamless integration with downstream analytics and reporting systems.

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ACHIEVEMENT MOTIVATION AS A PREDICTOR OF ACADEMIC PERFORMANCE?

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ABSTRACT

Academic Achievement motivation refers to a person's need to achieve academically and his willingness to do things that he or she considers important or valuable and endeavors to achieve perfect results. Students who are oriented towards achievement, in general, enjoy life and feel in control. This study highlights the profound impact of achievement motivation on students' academic performance. It lays the foundation for a comprehensive review of various aspects of the subject, defining motivation as the desire to succeed and achieve goals. It discusses the influence of motivation on academic outcomes and emphasizes its theoretical perspectives, research-based evidence, and practical applications. Additionally, it seeks to understand the complex relationship between motivation and performance, identifying mediating and moderating factors such as self-efficacy, personality traits, and environmental influences. The review aims to provide valuable insights for educators, psychologists, and policymakers to help them develop effective strategies. Overall, this introduction focuses on understanding and utilizing achievement motivation in depth to enhance students' academic success.

KEYWORDS – *Achievement, Motivation, Academic Performance, Environment*

INTRODUCTION

The concept of the need for achievement was introduced by Murray (1938), and is considered a significant personal component. He defined it as the desire to overcome difficulties and obstacles to complete tasks accurately and quickly. Additionally, achievement motivation has been understood as the need for achievement, power, and affiliation (McClelland et al., 1953). McClelland et al. (1958) stated that success in competition against a standard of excellence is regarded as the need for achievement. McClelland (1961) also noted, "The need for power focuses on controlling the means of influencing a person, while the need for affiliation is about establishing, maintaining, or restoring a positive relationship with others." Hasanzadeh (2009) pointed out that the achievement motive is a social need that aims to overcome barriers and achieve high standards, and it focuses on surpassing others through competition. McClelland (1985) recognized the need for achievement as a distinct human motive that can be differentiated from other needs. He explained it as the extent to which people vary in their efforts to attain rewards, such as physical satisfaction, praise from others, and a sense of personal mastery. Ugodulunwa (1997) stated that achievement motivation drives individuals to desire success and put in the necessary efforts to achieve it. It focuses on attaining success to achieve life goals. Achievement goals can influence the ways in which tasks are performed and the desires to demonstrate competence (Harackiewicz et al., 1997). Coleman (2001) defined it as a social form of motivation, which includes competitive drives aimed at meeting standards of excellence. Ghasemi et al. (2011) noted that it is related to the methods, plans, and efforts to achieve specific goals, and it also affects feelings of self-worth. Eres (2011) explained that educational institutions view achievement motivation as behavior related to performance excellence. Akpan & Umobong (2013) highlighted that achievement motivation is the force that drives an individual to act in order to achieve success. Wani & Masih (2015) defined it as a strong psychological drive through which a person desires to attain excellence. They believed that a positive and healthy environment for student development could promote achievement motivation among them. Vallance (2004) described it as the motivation behind accomplishing success. According to McCollum (2005), achievement motivation is the reason behind students' success. Okolo et al. (1993) emphasized that the combined effort of both students and institutions is the primary source of achievement motivation, arising from the interaction of students' characteristics and instructional practices. The relationship between achievement motivation and academic performance has long captured the attention of educators and psychologists. Achievement motivation, which reflects an individual's drive to achieve success and accomplish goals, is considered a crucial factor in academic success. This motivation not only influences students' learning behaviors and efforts but also shapes their performance outcomes. Prominent psychological theories, such as McClelland's Need Achievement Theory and Deci and Ryan's Self-Determination Theory, provide a theoretical foundation for understanding achievement motivation. These theories explain how intrinsic motivation, like a natural interest in learning, and extrinsic motivation, such as rewards and recognition, shape students' academic experiences. This study aims to conduct an in-depth analysis of



the impact of achievement motivation, focusing on its theoretical foundations, mediating factors affecting performance—such as self-efficacy and personality traits—and practical applications. The review sheds light on this complex subject and highlights how understanding and applying achievement motivation can lead to improved academic performance. Ultimately, this article provides valuable insights for educators, psychologists, and policymakers, contributing to creating a more motivating and successful academic journey for students. David McClelland's research laid the foundation for the study of achievement motivation. He and his colleagues coined the term "n Ach," which stands for "need for achievement." This theory posits that one of the most important driving forces behind a person's success and accomplishments is their need for achievement. According to this, people work towards those things for which they are rewarded. High achievers engage in tasks that help them perform better than others, meet specific standards, or do something extraordinary. The desire for success is found to some extent in all individuals. Students with a strong drive for achievement put in significant effort to succeed. Thus, achievement motivation is understood as the need to work toward things like physical satisfaction, praise from others, and a sense of personal mastery (Chauhan, 2004, pp. 222-223).

THEORETICAL PERSPECTIVES

- **McClelland's Need Achievement Theory** - McClelland (1961) highlighted two key aspects of motivation: the need for achievement (n-Ach) and the fear of failure. Individuals with high n-Ach are drawn to challenging goals and put in hard work to achieve them. Their strong desire for success and perseverance in the face of difficulties lead to excellence in academic performance. Such individuals view difficult tasks as opportunities due to their confidence and focused approach. In contrast, students driven by the fear of failure tend to avoid complex tasks, which limits their growth. These students prioritize safe and simple tasks to avoid failure, which can hinder their academic progress. Understanding this distinction can help educators and policymakers develop motivational strategies to encourage students to fully utilize their potential.
- **Self-Determination Theory (SDT)** - Deci and Ryan's Self-Determination Theory (SDT) differentiates between intrinsic and extrinsic motivation. Intrinsic motivation occurs when an individual engages in an activity for inherent satisfaction, such as the joy of learning, while extrinsic motivation occurs when an individual performs a task to gain external rewards, like grades or recognition. According to SDT, intrinsic motivation is deeply linked to academic success. Intrinsically motivated students show a deep interest in the learning process, feel connected to the material, and are more enthusiastic about facing challenges. They pursue tasks based on genuine interest, leading to better academic outcomes. In contrast, students driven by extrinsic motivation may perform well in certain situations, but their commitment and long-term engagement tend to be lower. This theory highlights the importance of fostering intrinsic motivation to enhance academic success.
- **Goal Orientation Theory** - This theory identifies two main types of achievement motivation: mastery-oriented goals and performance-oriented goals. Mastery-oriented goals focus on learning and improving skills, emphasizing intrinsic satisfaction in mastering new tasks. Mastery-oriented students are motivated by personal growth and overcoming challenges, leading to sustained effort, perseverance, and deep engagement. They view failures as opportunities to learn, not as setbacks, which leads to improved academic outcomes over time. On the other hand, performance-oriented goals aim at gaining external approval, such as grades or praise, with the goal of demonstrating competence to others. Performance-oriented students are driven by the need to prove their abilities, which may lead to immediate success, but they may experience anxiety or a fear of failure when faced with challenges. While they may excel in certain tasks, their persistence and intrinsic engagement may not reach the same level as that of mastery-oriented students.

EMPIRICAL EVIDENCE

1. Positive Correlation Between Motivation and Performance

Studies have shown that there is a positive relationship between achievement motivation and academic performance. High-achieving students are generally more intrinsically motivated, which leads them to engage deeply with learning tasks. Their intrinsic motivation fosters continuous effort and dedication, even in the face of challenges, allowing them to succeed in their endeavors. As a result, these students not only achieve higher grades but also experience greater satisfaction from their learning process. Their motivation is driven more by the intrinsic satisfaction of mastering tasks than by external rewards, which plays a crucial role in their academic performance and success.

2. The Role of Self-Efficacy

Bandura's concept of self-efficacy suggests that a student's belief in their ability to succeed in tasks or challenges influences the relationship between motivation and performance. When students have high self-efficacy, they set larger goals for themselves because they believe in their capabilities. These students put in more effort and persist despite facing challenges or setbacks. Their confidence and resilience help them overcome difficulties and stay focused on achieving their goals. As a result, students with high self-efficacy tend to perform better academically, as their continuous effort and confidence drive their success.



3. Cultural and Contextual Variations

Achievement motivation varies across cultures, influenced by the cultural values and social structures of each society. In collectivist cultures, such as in East Asia, external factors like family expectations, social norms, and community approval play a significant role in educational motivation. In these societies, students feel a sense of responsibility towards their family and society and prioritize group success over individual achievement. In contrast, individualistic cultures, such as those in Western societies, emphasize personal goals, self-reliance, and individual success. Here, students are motivated by personal growth, career aspirations, and the desire to prove their abilities. Thus, cultural context determines the sources of students' motivation and how they perceive achievement.

4. The Impact of Teacher Support

Empirical studies show that teachers play a crucial role in fostering achievement motivation in students. Teachers who provide constructive feedback and create a positive, motivational environment enhance students' intrinsic motivation. When teachers recognize students' efforts and provide guidance, they encourage a sense of self-confidence and autonomy. This supportive environment increases students' academic engagement, helping them persist in the face of challenges and achieve better results. In this way, teachers help students gain more confidence and motivation in their education.

FACTORS INFLUENCING THE RELATIONSHIP

- 1. Socioeconomic Status (SES)** - Socioeconomic status (SES) indirectly influences achievement motivation as it determines access to resources, parental involvement, and educational opportunities. Students from higher SES backgrounds have greater access to educational resources such as tutors, extracurricular activities, and technology, which enhance their learning experience. Additionally, parents from higher SES families are more actively involved in their children's education, providing emotional and financial support. This increased support boosts students' confidence and skills, improving their academic motivation. As a result, students from higher SES backgrounds tend to be more motivated and achieve better academic success.
- 2. Personality Traits** - Certain traits, such as responsibility, perseverance, and openness to experience, influence academic motivation and performance. Responsible students are organized and disciplined, while students driven by perseverance achieve success by continuously putting in effort and overcoming challenges. Openness to experience fosters curiosity towards new ideas and knowledge, enriching their learning experience. The combination of these traits ensures academic success and sustained effort.
- 3. Peer Influence** - Peers have a dual impact on academic motivation. Supportive and inspiring peer groups create a positive and collaborative environment that fosters intrinsic motivation and mutual progress. These peers provide emotional support, which boosts students' self-confidence and academic engagement. On the other hand, negative peer pressure can diminish academic motivation, leading to distractions, lowered aspirations, and reduced performance. Such peers promote negative beliefs or behaviors that can hinder academic success.
- 4. Role of Technology** - The integration of technology in education has given a new direction to the dynamics of motivation, introducing new and creative ways to inspire students. In gamified learning environments, educational content is presented in the form of a game, incorporating rewards, levels, and challenges. This encourages students to actively participate and stimulates their intrinsic motivation, fostering a sense of achievement and competition. Additionally, personalized digital platforms have completely transformed the approach to education, as these platforms are tailored to students' learning pace and style. They provide instant feedback, customized lessons, and interactive tools, making learning more accessible and individualized. For tech-savvy students, this integration further enhances their motivation, as it connects them with technology they are comfortable and excited to use. Thus, technology-driven education not only makes learning more engaging but also motivates students to become deeply involved and persistently work, improving their overall academic performance.

PRACTICAL IMPLICATIONS

1. Strategies for Educators

- Promoting Mastery Goals:** Teachers can design curricula that focus on improving students' skills rather than promoting competition. By emphasizing essential skills like collaboration, critical thinking, and problem-solving, students progress individually. Such a curriculum creates a supportive and positive learning environment, reducing stress and helping students build confidence in their abilities without external pressure.
- Building Self-Efficacy:** When students are encouraged to work towards achievable goals, it strengthens their confidence and motivation. Celebrating small successes gives them a sense of accomplishment and belief in their efforts, driving them to keep persevering.



- **Intrinsic Motivation:** Incorporating real-life examples into education and promoting curiosity helps students understand concepts in practical contexts, making learning more useful and engaging. This approach stimulates intrinsic motivation, increasing students' involvement and curiosity towards new ideas.

CHALLENGES AND FUTURE DIRECTIONS

1. Measuring Achievement Motivation

Although significant progress has been made in understanding motivation, accurately assessing it remains challenging due to its subjective nature. Motivation varies among individuals, influenced by their personal experiences, emotions, and environmental factors. Standardized tools such as surveys and questionnaires often fail to capture this complexity and only provide a limited view of motivation. These tools may overlook key aspects like intrinsic motivation, personal goals, and external influences, making it difficult to accurately assess an individual's motivation and its impact on their behavior or performance.

2. Addressing Motivation Deficits

Interventions for students with low achievement motivation should adopt a comprehensive approach, which includes addressing emotional barriers through counseling, providing guidance and encouragement through mentoring, and offering support tailored to the student's characteristics through personalized study plans. This strategy enhances students' self-confidence, fosters independence, and uncovers their intrinsic motivation.

CONCLUSION

Achievement motivation is a critical determinant of academic performance, shaped by intrinsic and extrinsic factors, self-efficacy, personality traits, and environmental influences. By fostering a supportive environment and leveraging evidence-based strategies, educators and policymakers can enhance student motivation and performance. Future research should address existing gaps and provide insights for creating equitable and motivating educational systems. Achievement motivation is a crucial factor in academic success as it motivates students to face challenges and strive for excellence. This study focuses on theories like McClelland's 'Need Achievement Theory' and Deci and Ryan's 'Self-Determination Theory,' which explain how intrinsic and extrinsic motivation influence students' performance. The findings clearly indicate that a positive educational environment, supportive teachers, and the development of self-efficacy can enhance achievement motivation. Additionally, personality traits, socioeconomic status, and peer influence also play a role in shaping the motivation-performance relationship. Educational institutions should adopt strategies that promote intrinsic motivation, mastery goals, and self-efficacy to help students realize their full potential. However, challenges exist in measuring and addressing motivation deficits, requiring a personalized approach to effectively support students. Overall, understanding achievement motivation and its determinants can be valuable in education, mental health, and policymaking, leading to the creation of an inspiring and successful academic environment for students.

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A REVIEW OF CORDIA DICHOTOMA'S POTENTIAL ANTIOXIDANT

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ABSTRACT

The genus *Cordia* contains a large number of trees and shrubs that are frequently found in warmer climates and have been used to treat a variety of illnesses. Numerous phytochemicals with varying activity, including as flavonoids, alkaloids, terpenes, tannins, and glycerides, were separated and tested from various *C. Dichotoma* sections. This plant has been shown to have several significant pharmacological qualities, such as hepatoprotective, antidiabetic, anti-inflammatory, anthelmintic, analgesic, anticancer, antioxidant, and antibacterial effects. *C. Dichotoma* is a promising natural antioxidant source with notable anti-inflammatory and therapeutic effects. We have covered the antioxidant potential of *C. Dichotoma* in brief in this review, which can be used as a guide for further studies on the plant's potential health benefits.

KEYWORDS: flavonoids, *Cordia dichotoma*, antioxidant, and anti-inflammatory

INTRODUCTION

Researchers are still facing a significant obstacle in the form of managing diseases with drugs that have no adverse effects. Many disorders affecting multiple human systems are treated with plant species belonging to the genus *Cordia*. The tropical and subtropical tree *C. Dichotoma* is also referred to as *Lasura* in Hindi and *Shleshmataka* in Sanskrit. Several phytoconstituents with distinct bioactivities, including flavonoids, triterpenes, tannins, alkaloids, and fatty acids, were extracted from several *C. Dichotoma* plant sections. Numerous studies have documented the pharmacological uses of *C. Dichotoma*, including anti-ulcer contraceptives anti-inflammatory anthelmintic, analgesic, anticancer antioxidant antimicrobial antifungal hepatoprotective and diuretic uses, as well as the treatment of disorders of the digestive system, respiratory, urogenital, cardiac, vascular, and blood. *C. Dichotoma* is a promising natural antioxidant source that has outstanding anti-inflammatory properties and can be used as a food ingredient. The current review's goals are to give a general overview of *C. Dichotoma*'s use as a herbal antioxidant.



Fruit



Leaf

**Flower****Fruit C. Dichotoma****Steam Bark****Fig. 1 Various Parts of Cordia Dichotoma**

Classification: :- Kingdom: Plantae;
Division: Magnoliophyta;
Class: Dicotyledons;
Subclass: Astariae;
Order: Lamiales;
Family: Boraginaceae;
Genus: Cordia; Species: C. Dichotoma Forst.

Distribution: The sub-Himalayan tract is where it grows. And beyond ranges, rising to a height of roughly 1500 m. It can be found in a variety of woodlands, including From the Western Ghats' damp deciduous woods From Myanmar's tidal woods to the arid deciduous Rajasthan woodland. It flourishes in Maharashtra in the Likewise a wet monsoon forest

Botanical Description: The family C. Dichotoma Small to moderately sized deciduous trees in the Boraginaceae family have a spreading crown, a short crooked stem, and a short bole. The stem bark has a smooth or wrinkled longitudinal pattern and is colored grayish brown. Simple, whole, slightly dentate, elliptical-lanceolate to broad ovate, with a circular and cordate base characterize the leaves. These 25 mm long, dull pinkish edible fruits have sticky flesh. The blooms are bisexual, short-stalked, white, and arranged in loose corymbose cymes. The fruit is a shiny, golden or greenish-yellow drupe that sits on an expanded calyx that resembles a saucer. When it ripens, it turns black and the pulp becomes viscid. A hard stone has one to four seeds.

Herbal Antioxidant, C. Dichotoma

Numerous illnesses, including diabetes mellitus, cancer, arthritis, aging, and others, are caused by free radicals. Due to its capacity to scavenge free radicals, herbal antioxidants have become increasingly significant in the treatment of various ailments in recent



years. Plants have received a lot of attention because they are the natural source of antioxidants. Finding an antioxidant chemical with strong bioactivities and minimal to no adverse effects has garnered more attention lately, both domestically and internationally. An imbalance between the generation of free radicals and the organism's capacity to neutralize or detoxify them by neutralizing their harmful effects through the action of antioxidants is known as oxidative stress. Due to their high reactivity, free radicals can damage all biological macromolecules, including DNA, proteins, and lipids. This can result in cell damage, which can then lead to the emergence of pathological conditions like diabetes, inflammatory diseases, and cardiovascular diseases. Antioxidants are secondary compounds or metabolites that act as ROS scavenger and activator of cellular antioxidative enzymes to counteract the damages induced by ROS in biological system. As a result, naturally occurring antioxidants derived from plant polyphenols are gaining increased recognition for their potential applications as powerful and safe bioactive substances. The presence of phenols, flavones, isoflavones, flavonoids, xanthenes, alkaloids, anthraquinones, phytosterols, steroids, amino acids, anthocyanins, and isothiocyanate may be responsible for this plant's antioxidant action. Lignans, catechins, isocatechins, coumarins, and indoles, among others^{20, 21, and 22}. The literature has. *Dichotoma*'s antioxidant activity^{5,6,9,12,20,23, and 24}. It has been demonstrated that quercetin, a phytochemical derived from hence enhance cardiovascular function. Quercetin has the ability to enhance endothelial function, boost nitric oxide production, and prevent platelet aggregation.^{20, 23} The effect of *C. Dichotoma* seed and leaf extract's capacity to scavenge free radicals on degenerative diseases was investigated by Sharma et al.¹⁶. According to the authors, these models display positive antioxidant activity that is concentration-dependent, with the highest concentrations showing the highest level of antioxidant activity (100 µg/ml). The findings indicated that the level of antioxidant activity in leaves was higher than in seeds.

CONCLUSION

“*Cochlospermum dichotoma* is a plant that has long been used as medicine has been extensively studied over the past three decades, revealing its rich phytochemical profile and diverse pharmacological properties. Research has identified various bioactive compounds, including flavonoids, triterpenes, tannins, alkaloids, and fatty acids, which contribute to its:

- Analgesic
- Anti-inflammatory
- Antimicrobial
- Antiviral
- Wound healing
- Antidiabetic
- Antifertility activities

Flavonoids and phenolic compounds are primarily responsible for its antioxidant properties, confirmed by IC₅₀ data correlation. Given its long history of traditional use and established scientific evidence, further exploration of *C. Dichotoma*'s potential is warranted, providing valuable insights for future research in traditional medicine.”

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COMPREHENSIVE AYURVEDIC CARE FOR EYE AND ENT DISORDERS

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ABSTRACT

The shira or head is the most important organ among all the vital organ of body because it resides life along with sense faculties or gyanenindriyas. Shalakya tantra is one among ashtanga ayurveda, dealing with urdhvajatrugata rogas i.e. diseases occurring above the clavicle which includes shira, netra, karna, nasa and mukha. The chaotic lifestyle, faulty food habits, reduced physical activity, over exertion at work, subjection to various environmental changes, increased screen time and over exposure to radiations due to scientific advancement in technology which creates a stressful never ending vicious cycle which has precarious effects on the sense organs. According to Ayurveda "Sarvendriyanam Nayanam Pradhanam" eyes are the principal organ providing sight. The vital information about manifestation of various eye diseases if accounted for, can help in preventing and treating the leading causes of blindness. It is prerequisite to identify the cause then treat the ailment for reimposing the health of indriyas. Ayurvedic management of ophthalmic & ENT disorder manifesting via eye, ear, nose, oral route aims to pacify the vitiated doshas by various kriyakalpa procedures, shodhan and shaman chikitsa which alleviate the symptoms and provides strength to sense organs or indriyas & inflicts better quality of life to individual.

KEYWORDS- Kriyakalpas, Urdhwajatrugata roga, Gyanenindriyas, Srotas, Panchkarma, Netra rogas

INTRODUCTION

Shalakya tantra is one of the fully fledged branches of Ashatanga ayurveda which deals with urdhwajatrugata roga i.e. diseases occurring in supraclavicular region which includes ophthalmology and otolaryngology. Shira has been described as uttamangatvam where prana and panchagyanendriyas reside². It is also included as one among the trimarma and its injury is proved to be fatal. The Netra or eyes behold the most prominent place among all other gyanendriyas. Without sight this world seems like an abyss. Nasa has been described as Nasa hi Shirsodwaram³ door or gateway to Shira which makes it an important sense organ alongside karna which providing the function of hearing. All these sense organs act simultaneously to help the individual to learn and thrive in accordance with the environment. All the urdhwajatrugata rog are treated on the ayurvedic principle of sanshamana and sanshodhan which is achieved by various kriyakalpa and panchkarma procedures and shastra & anushastra karma.

MANAGEMENT OF NETRAROGAS (OPHTHALMIC DISEASES)

Acharya Charaka explained 4 types of eye diseases on the basis of doshas that are Vataja, Pittaja, Kaphaj, Sannipataja. Acharya Nimi explained 76 types of netraroga⁴ netraabhisya, adhimantha, Arma, netra shukra, nimesha. The treatment aims at pacifying the potential vitiated doshas in the particular eye disease and is achieved by undergoing various kriyakalpa procedures.

The word kriya means therapeutic procedures and kalp means specific medicinal formulations. It is a bahiparimarjana chikitsa & has several benefits over oral administration of drugs. Acharya Sushruta has mentioned 5 types of kriyakalp⁵ in Su. Uttarasthan 18 that are Tarpana, Putpaka, Seka, Aschytona, Anjana. Acharya Sharangdhara has explained 2 more types – Pindi and Vidalaka⁶.

TARPANA⁷-It is the procedure of retaining the medicated ghee or oil over the eyes for a specified time period. The liquified medicated oil is poured inside the wall made around the eyes by Masa flour dough and the tip of the eyelashes are made to submerge on the medicated ghee or oil. The Sneha dharana kala (matrakala) is set in accordance with the causative doshas and the site of the disease in Akshimandala. The retained drug in the eyes has more contact and absorption time which in turn crosses corneal epithelium barrier due to its lipophilic activity thus increasing the bioavailability of drug. It is indicated in Adimantha (glaucoma), Timir, Abhisya, Shushkakshipaka (Dry eye), Jeeran netraroga.



PUTPAKA⁸- Its procedure is similar to that of *tarpana* with only difference in the preparation of medicine and duration. In this the extract is obtained from heating paste of plants, animal flesh by *putpaka vidhi*. The same extract being the suspension of fat-soluble & water-soluble contents is poured and retained over the eyes has better penetration rate through corneal epithelium than *tarpana* due to cumulation of its lipophilic and hydrophilic property. It can be done after *tarpana* or independently.

SEKA⁹- It involves continuous pouring of *dravaushadh* or medicated liquid solution in a streamline manner into partially opened eye from a height of *four angula* for specific time period. It is usually indicated in acute phase of eye disease for dosha *pachana* and *shaman*. Indications- *Timira*, *Abhishyanda*, *Netrashoola*, *Shushkakshipaka*.

ASCHYOTANA-This procedure involves instilling few drops of aqueous extracts or solution of drugs into the open eye from a height of *two angula*. It is mentioned as *aadyaupkrama* meaning the first line of treatment in eye disorders. Indicated in acute phase such as *Abhishyanda*, *Netrashoola*, *Netrapaka*, *Pothki*, *Parvani*, *Upnaha*. The active constituents present in the aqueous solution are absorbed through the conjunctiva and cornea but most of it is drained through the nasolacrimal duct promptly providing very little tissue contact time.

ANJANA¹⁰-It is application of collyrium or medicinal pastes into the inner side of lower lid or the conjunctival fornices with a *Anjana shalaka* (applicator). *Anjana* is prepared out of amalgamation of minerals, metals (like arsenic, lead, antimony), herbs and animal matter. Usage of *anjana* is prohibited until the acute inflammatory symptoms does not subside. It should be used only when full manifestation of each dosha is present (means the body should be free from *ama dosha lakshana* like redness, swelling, congestion) and localised in the eye. It potentially has *lekhana* properties and has more bioavailability due to more tissue contact time. Indication- *Jeeran netraroga*, *Pishtak*, *Arma*, *Netra shukra*.

PINDI¹¹-The lukewarm paste of drugs is applied in the form of poultice on the closed eye for local sudation. The medicine is absorbed through the skin of eyelids resulting in vasodilation and drainage of toxins from the site due to poultice application. It is indicated in early stages of eye diseases like *Abhishyanda*.

VIDALAKA¹²- It is the application of paste of various drugs over the eyelids except the eyelashes. The thickness of the paste is same as that of *mukhalepa* and the paste is kept on the eyelids until it starts to dry. Indications-inflammatory conditions of eyelids, itching, burning sensation, excessive lacrimation. The absorption is similar to *pindi* and provides additional effect of reduction in IOP by vasodilation and aqueous drainage. The various drugs extensively used in *netraroga* are *Triphala*, *Purnava*, *Yastimadhu*, *Daruharidra*, *Rasna*, *Manjistha*, *Lodhra*, *Haridra*, *Dashmool*, *Shigru* etc.

Shastrakarma is indicated in various *urdhwajatrugata rogas*. According to *Acharya Sushruta* all surgical procedures are categorised into 8 types¹³. *Chedana* (Excision), *Bhedana* (Incision), *Lekhana* (Scraping), *Vyadhana* (Puncturing), *Eshana* (Probing), *Aharana* (Extraction), *Visravan* (Draining), *Seevan* (Suturing)

MANAGEMENT OF ENT DISEASES

SHIROBASTI¹⁴-It is the procedure in which medicated oil is retained on the head with the help of *shirobasti kosha* (cap) which is made up of animal skin with *12 angula* height & size is adjusted according to the circumference of the head. Its *dharana kala* (duration) is 10 times that of *tarpana*.

SHIROPICHU- *Sneha* dipped cotton is placed on the head for stipulated period of time.

SHIRODHARA-It involves continuous dripping of medicated oil in streamline fashion over the head and forehead. It is indicated in evening time. The *Sneha* after being retained has more tissue contact time & is absorbed through scalp and in turn acts as nourishment source for the *shirah* (head) and leads to mitigation of all the *doshas* in *urdhwajatru* (supraclavicular region). These all are highly recommended in *vataja shiroroga*, *shira toda*, *daha*, *timir*, *insomnia*, *Ardita*, *Karnashoola*, *Hanugraha*, to pacify aggravated *vata doshas*, overall soothing effect, nurturing hairs & scalp.

KARNAPOORAN¹⁵- Local massage and to sudation to area around the auricle followed by instilling *taila*, *swaras* in the ear canal is known as *karnapooran*. This protocol mainly acts on vitiated *vata* which is the key factor in most of the ear diseases manifesting as pain, ringing sound, degenerative changes. The *vatahara* property of *taila* and drugs used in *karnapooran* strengthens the nerves in the ear, removes the obstruction in *karnavha srotas* (minute channels) and aids in increasing hearing function of the ear. Duration in *karna roga* -100 *matra*, *kantha roga* – 500 *matra*, *shiroroga*- 1000 *matra*. Indications- *Karna nada* (tinnitus), *Badhriya* (deafness), *Karna shola*, *Krimikarna*. Widely used drug for *karnapooran*- *Bilvaadi taila*, *Kshar taila*, *Shambuka taila*.



KARNA DHOOPAN¹⁶- It is the method of aural fumigation by medicated dhooma created by burning *Guggulu, Agru, Sarshapa, Vacha, Ghrita* which has antiinflammatory and antimicrobial action. Indicated in *Vataj Karnashoola, Badhriya (deafness), Karna nada (tinnitus), Karnasrava, Krimikarna, Putikarna*.

KAVALA & GANDUSHA¹⁷-These are ancient ayurveda method of maintaining oral health and hygiene by retaining *Sneha (taila), kwath, swaras* in the mouth (*gandusha* or oil pulling) and holding and moving the *kalka dravyas* to and fro in the mouth (*kavala*). The drug is absorbed by sublingual and buccal mucosa due to its permeable nature and high vascularity which enhances the bioavailability and fast systemic delivery of drug. It is extensively used in mouth ulcers, bleeding gums, gingivitis, halotosis, tonsillitis, pharyngitis, dryness of throat, all other *mukha roga, karna & shiroroga*. It strengthens teeth, gums, prevents plaques, anti inflammatory action, tooth sensitivity and maintaining sustained oral dental health.

PRATISARANA¹⁸

Local application and massaging of oral mucosa and gums by churna, medicinal paste (*kalka, raskriya*) with the help of finger / *krapasa kritoshani shalaka* (applicator) is termed as *pratisarna*. The *vrana ropana* property of drugs induces increased salivation, antimicrobial activity which leads to flushing out of all the toxins from oral cavity and healing of the oral tissue. Majorly used drugs are *triphalā, mulethi, daruharidra, tankan, sphatika, saindhava lavana*.

Indicated in all types of *danta, jihvagata, sarvasara mukharoga* like mouth ulcers, bleeding gums, gingivitis, glossitis etc.

DHOOMPANA¹⁹

Part of the vitiated *Kapha* situated in the head is effectively eliminated by *Dhoompana*. It is to be used twice a day after *Nasya karma*. Smoke emitted from the herbal twig is inhaled through one nostril at a time, closing the other and it is done alternatively. Every time the inhaled smoke is to be expelled through the mouth. *Dhoompana* provides firmness to the teeth, clarity of mouth and pleasant smell. It prevents loss of taste and exudations of the oral cavity. Indicated in *Kasa, shwasa, mukhavairasya, shiroga, karna & akshishoola, abhishyanda*.

SHATKARMA IN URDHWAJATRUGATA ROGAS

Shatkarma is the set of six yogic cleansing techniques- *Neti, Dhauti, Basti, Nauli, Kapalabhati, Tratak*. *Neti karma* includes *jala and sutra neti*. It has been proven effective in sinusitis, allergic rhinitis, headaches, eye straining, watering & heaviness in eyes by expelling out all the mucus & toxins and thorough cleansing of the *urdhwanga*, removing the nasal obstruction, improving visual acuity, and preventing the reoccurrence of disease. *Dhauti & Kapalabhati* is helpful in asthma and respiratory disorders. *Tratak* is effective in eye diseases like myopia, strabismus, astigmatism by improving visual and cognitive power. *Basti & Nauli* are beneficial in *vata* vitiated diseases & digestive disorders.

PANCHKARMA IN URDHWAJATRUGATA ROGAS

Panchakarma also known as *shodhan chikitsa* is the pioneer in management of *urdhwajatrugata rogas*. It includes the *Poorvakarma Snehana and Swedana*. The *Pradhan karma* includes *Vaman, Virechana, Anuvasaan & Niruha basti and Nasya, Raktamokshana*. All the *panchkarma* therapies should be performed with utmost care and vigilantly observing the *samyaka, ayoga, atiyoga lakshanas*.

Table :Panchkarma according to involvement of Doshas in Urdhwajatrugata roga

Dosha Predominance	Treatment
<i>Vata</i> predominant disease	<i>Snehana Basti, Nasya</i>
<i>Pitta & Rakta</i> predominant diseases	<i>Virechana and Raktamokshana</i>
<i>Kapha</i> predominant diseases	<i>Vaman, Tikshna Nasya</i>

Snehana is of 2 types *Bahya snehana* is done by massaging the oil like *Tila taila, Bala taila* for oleation of the body. *Abhyantara snehana* is done by *ghrita pana* like *Jeevantiyadi ghrita, tilwaka ghrita, Triphala ghrita*. **Swedana** by decoction of *vatashamak dravya*.

Vamana¹⁹- In this procedure the vitiated doshas (*kapha* followed by *pitta*) are expelled out by the process of emesis through mouth and is indicated in *Kaphaja diseases*.



Roga Adhithana	Vamana Indications
<i>Netra roga</i>	<i>Pilla roga</i> <i>Kukunaka (done with Pippali, saindhava, Yastimadhu, Sarsapa kalka)</i> <i>Vartma lekha (snehana followed by vaman & virechana)</i> <i>Sashofa & Ashofa akshipaka</i>
<i>Karna roga</i>	<i>Karna kandu and krimikarna , Karna vidradhi , Karna nada & Badhriya , Kaphaja karnashoola</i>
<i>Nasa roga</i>	<i>Kaphaja pratishaya, Apeenasa, Putinasa, Urdhwagata raktapitta</i>
<i>Mukha roga</i>	<i>Upkush and Putimukha, Kaphaja Sarvasra roga</i>
<i>Kantha roga</i>	<i>Rohini & Kaphaja galganda</i>
<i>Shiro rog</i>	<i>Kaphaja shiroroga</i>

Virechana²⁰-Netra is the seat of *alochaka pitta* hence to pacify the aggravated *pitta* and eliminating toxins from the *netravaha srotas*. *Virechana* (purgation) is the most crucial *shodhana karma* in ophthalmic disorders like *Akshipaka* (with decoction prepared from *Drakshya, Haritaki & Trivrita*), in *Vataja Abhishyanda* and *Adhimantha* *Virechana* is indicated followed by *basti*.

Roga Adhithana	Virechana Indications
<i>Karna roga</i>	<i>Sneha Virechana with Erand taila in Karna shola, Karna nada, Karna shweda & Badhriya.</i>
<i>Nasa roga</i>	<i>Pittaja pratishaya, Raktaja, Sannipataja nasa roga, urhwagata raktapitta.</i>
<i>Mukha roga</i>	<i>Pittaja mukpaka, Pittaja & Kaphaja Sarvasara mukhroga.</i>
<i>Shiro and kapalgata roga</i>	<i>Suryavrat, Ardhavabhedaka, Anantvata, Indralupta, Khalitya & Palitya</i>

BASTI²¹- It is the principal treatment in *vataja* diseases and involves introducing *Sneha, Ksheera, Kashaya* etc to rectum or colon through anus. Types- *Anuvasana, Niruha, Yog, Kala, Matra basti*. The *basti dravya*, on reaching the *pakvashaya* the spreads in body through micro & macro channels, carrying out *tridosha shamak* action.

Roga Adhithana	Basti Indications
<i>Netra roga</i>	<i>Abhishyanda, Adhimantha, Timir</i>
<i>Shiro rog</i>	<i>Vataja, Pittaja, Kaphaja shiroroga, Ardhavabhedaka, Anantvaat, Suryavrat</i>

NASYA²²- Process of the administering *sneha (taila, ghrita), swaras, kashaya, churna, dhooma* by nasal route. The drug administered through nostrils reaches the *sringatak marma* & spreads in the *murdha* (brain), *netra* (eye), *shrotra* (ear), *kantha* (throat) and scrapes out all the morbid *doshas* from the supraclavicular region. Since the olfactory mucosal surface is in direct contact with central nervous system. The drug is absorbed through paracellular space of olfactory mucosa into lamina propria. From lamina propria, it is transported through perineural space to subarchnoid space hence directly reaching to brain tissue. The vitiated *doshas* situated in *shirah* are completely eliminated by this procedure. Indicated in individuals of 7 to 80 yrs of age. It is the most favourable therapeutic procedures in *urdhwajatrugata vikaras*.

Roga Adhithana	Nasya indications
<i>Netra roga</i>	<i>Sushakshipaka, Avrana shukra, Sasofa & Asofa akshipaka, Timira, Balasgrathith etc</i>
<i>Karna roga</i>	<i>Karna shola, Karna srava, Putikarna, Krimi karna</i>
<i>Nasa roga</i>	<i>Apeenasa, Putinasa, Nasanaha, Nasa sosha, Pratishaya, Urdhwagata raktapitta</i>
<i>Mukha roga</i>	<i>Galashundika, Danta veshta, Talu shosha, Sheetada, Pittja jihvakantak, Upkusha, Upjihivika</i>
<i>Kantha roga</i>	<i>Vataja & Kaphaja rohini, Kaphaja galganda</i>
<i>Shiro roga</i>	<i>All types of shiroroga, Khalitya and Palitya</i>

RAKTMOKSHANA²³ is considered as *Ardhachikitsa* in *Shalakya tantra* it is done through *Siravyadhana*-The vein in the frontal area, outer canthus, inner canthus or near the diseased site is punctured for letting out vitiated *Rakta* and *Jaloukavacharan*-Impure blood & toxins are sucked out is by applying leech to the site of the disease²⁴. It modifies capillary circulation hence maintains the blood pressure, acts as immunomodulant & anti inflammatory action, purifies blood by expelling out aggravated *Rakta dhatu* and *Pitta dosha*. Indication- Age criteria is 16 to 70 years of age.



Rog Adhithana	Raktamokshana Indication
Eye disorders	<i>Puyalasa, Savrna shukla, Pittaj & kaphaj timir, Abhishyanda and Adhimantha, Pilla roga.</i>
ENT disorders	<i>Badhriya (siravedhana done near the ear), Rohini, Eka vrinda, Kantha shaluka, Vataj and Kaphaj & Medoja Galaganda, Krimidanta, Soushira, Sheetada, Dantaveshta, Upajihwa, Anantavatta, Suryavarta, Ardhavabhedaka, Pittaja Shiroroga.</i>

Contraindication²⁵- very young, old, emaciated and exhausted, anaemic, lactating mother, pregnant women.

Sanshaman chikitisa involves use of various herbal, herbo-mineral formulations and *rasaushadhis* orally like *Abhrak Bhasma*, *Saptamrita lauh*, *Yashada bhasma*, *Chandraprabhavati*, *Vatachintamani rasa*, *Praval panchamrit*, *Rasrajras*, *Kharva pishti* are used in treating the ophthalmic and ent disorders such as cataract, glaucoma, macular degeneration, sinusitis, allergic rhinitis, hearing loss, CSOM, epistaxis.

DISCUSSION

Kriyakalpas & all other therapeutic ENT procedures mentioned in ayurvedic texts has a sole aim of mitigating all the aggravated *doshas*, eliminating toxins from supraclavicular region, nurturing the head and all the *gyanendriyas* residing in it. This aim is achieved by maintaining proper concentration of the drugs used, increasing tissue contact time which increases absorption rate instantly, transportation of drug molecules into the minute channels (*Srotas*) of all the *indriyas*, expulsion of all the toxins from the channels which alleviates the symptoms of *Urdhwajatru vikaras*.

CONCLUSION

Shalakyata basically deals with diseases residing in *urdhwajatru* involving all the sense organs except skin. These sense organs play a vital role in gaining knowledge of the surrounding and peaceful coexistence with other individuals. The dosha imbalance and *srotas avrodha* (obstruction) leads to manifestation of various ophthalmic and ent disorders which adversely affect the quality of life of an individual by hampering the special sense of vision, olfaction, taste, hearing & vestibular function. Various *marmas* like *vidhura mara* (behind the ear), *phana marma* (inside the nose), *avarta* (located above & middle of the eyes), *apanga* (on the side of outer canthus), *shankha* (temple region) *utkshepa* (above the temporal region), *stapani* (in glabellar region between the eyebrows) *seemanta* (cranial sutures), *sringaataka* (deeper in the nose), *adhipathi* (located at external occipital protuberance) are located in head, injury to these vital spots or *marmas* leads to serious disability (neurological, motor and sensory impairments) and even death²⁶. Hence it is necessary to protect the *gyanendriyas* and *marmas* from injury and following all the *swasthyavritta* (*dincharya* & *ritucharya*) related to *netra*, *karna*, *nasa*, *mukha*), *pathya- apathya* (*ahara* & *vihara*) protocols mentioned in ayurvedic texts for maintaining eminent *dosha* & *dhatu* balance, timely drainage of all the secretions & toxins from the body and exempting individuals from any kind of ailments. Allocation of the drugs is done according to their *veerya*, *doshahar* and *ropana* properties and prominent manifestation of *doshas* in various ophthalmic and ent disorders. The therapeutic procedures are wisely chosen by the clinician on the basis of *dosha*, *kala*, *bala* of patient and (site of disease, type of *doshas* involved etc). All the ocular and ent therapeutic procedures not only provides local symptomatic relief but also ensures the proper absorption and delivery of the potential drug into the target organ eventually treating the root cause of the disease. It also imparts the *Balya* (immunity booster), *Rasayan* (rejuvenation), *Medhya* (increasing brain grasping power) effect by the cumulative action of the drugs and therapies which clearly defines the *Ayurveda proyojana* that is “*Swasthyasya Swasthya Rakshanam* and *Aaturasya Vikarprasmanam*”²⁸

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FROM ISOLATION TO RECONNECTION: HOW SOCIAL-EMOTIONAL LEARNING RESHAPES STUDENTS' SOCIAL SKILLS AND EMOTIONAL ADAPTATION

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ABSTRACT

This study investigates the impact of Social-Emotional Learning (SEL) on students' social interactions and emotional adaptation in the context of the COVID-19 pandemic. The research reveals that the pandemic has exacerbated students' anxiety, loneliness, and emotional regulation issues, while SEL has played a pivotal role in alleviating these emotional struggles and addressing the deficits in social skills. Employing a mixed-methods research design, which includes a literature review and empirical surveys, the study evaluates both the theoretical framework and practical outcomes of SEL. The findings indicate that SEL significantly enhances students' social awareness, interpersonal skills, and self-regulation abilities, making it crucial for the psychological well-being and social skill reconstruction of students in the post-pandemic era. The paper proposes strategies to foster social interactions, emotional support activities, and the active involvement of educators to facilitate students' social reconnection and emotional regulation. Moving forward, SEL is poised to become a key strategy in cultivating resilient, socially responsible, and emotionally intelligent future citizens.

KEYWORDS: *Social-Emotional Learning; Social Skills; Emotional Adaptation*

1. INTRODUCTION

The global spread of the COVID-19 pandemic has posed unprecedented challenges to education systems, with the rapid shift to online learning severely limiting students' social interactions and significantly impacting their academic performance, mental health, and social skills. Research indicates that prolonged isolation has exacerbated issues related to anxiety, loneliness, and emotional regulation (Perry et al., 2021). Consequently, educational scholars and policymakers are urgently seeking effective strategies to alleviate emotional distress and bridge the gap in social skills. Social-Emotional Learning (SEL), as a holistic educational approach, is widely regarded as a key strategy for restoring students' mental health and social competencies. Durlak et al. (2011) asserted that SEL programs not only significantly improve academic performance but also assist students in managing emotions, building healthy relationships, and enhancing social awareness. In the post-pandemic era, the importance of SEL is further amplified, particularly in helping students navigate psychological challenges (Zinsser et al., 2020).

During the pandemic, students' emotional regulation and social skills faced considerable challenges, with these issues being especially pronounced among adolescents (Belfield et al., 2020). SEL helps students restore emotional trust and social competence through emotional recognition, emotion regulation, and conflict management, thereby enhancing their adaptability in complex social situations. Furthermore, SEL has demonstrated potential in fostering cross-cultural understanding and cultivating a sense of social responsibility. Research shows that SEL supports students in adapting to multicultural environments and strengthens their global responsibility (Payton et al., 2008). UNESCO (2015) emphasizes that integrating SEL with global citizenship education broadens students' global perspectives and contributes to the achievement of sustainable development goals. The transformative SEL approach highlights social justice and culturally responsive teaching, fostering students' critical thinking and social engagement abilities (Jagers, Rivas-Drake, & Borowski, 2019).

Despite the significant impact of SEL, its implementation faces several challenges. Belfield et al. (2020) note that social isolation may hinder students' ability to rebuild trust and cooperation. Educators need to adopt scientifically grounded SEL strategies to facilitate students' smooth transition into healthy social environments. Overall, SEL is not only an effective tool for addressing mental health crises but also a key pathway for restoring and enhancing students' social competencies. As the educational landscape gradually recovers, the long-term implementation of SEL—especially through policy support and teacher training—will ensure its widespread adoption and quality improvement at all educational stages, ultimately embedding it into the educational system to cultivate future citizens with emotional intelligence and social responsibility.

2. RESEARCH METHODOLOGY

This study aims to explore the impact of Social-Emotional Learning (SEL) on students' social and emotional adaptation in the post-pandemic era. A mixed-methods research design was adopted, combining both quantitative and qualitative approaches to gain a more comprehensive perspective. The study consists of three stages: literature review, empirical survey, and case analysis.



2.1. Literature Review

In the literature review phase, the study systematically searched for and analyzed relevant academic literature to construct the theoretical framework of SEL and assess its application in educational practice. The literature sources included international databases such as Web of Science, ERIC, and Google Scholar. Keywords such as "Social-Emotional Learning," "Post-Pandemic Era," and "Student Adaptation" were used to identify the theoretical trajectory of SEL, evaluate its historical effectiveness, and identify gaps in existing research.

2.2. Empirical Survey

In the empirical survey phase, a cross-sectional research design was adopted, collecting data through online questionnaires and video interviews. The sample included middle and primary school students from various regions and types of schools to ensure the broad applicability of the findings.

Online Questionnaires

Two online questionnaires were designed—one for students and the other for teachers. The questionnaires addressed topics such as SEL awareness, implementation effectiveness, and personal experiences. The surveys were distributed via email and social media platforms to ensure participant anonymity.

Video Interviews

Semi-structured video interviews were conducted with selected school administrators and teachers to explore their views on SEL programs, challenges encountered during implementation, and suggestions for program improvement. The interview content was transcribed and analyzed for key themes and insights.

Data Analysis

Questionnaire data were analyzed using R programming for statistical analysis, including frequency distribution, mean comparisons, and factor analysis. The transcribed interview texts were qualitatively analyzed using MAXQDA software to identify and code key themes.

2.3. Research Ethics

Throughout the research process, strict adherence to ethical guidelines was maintained. All data collection and analysis were conducted with the informed consent of participants, and the data were used solely for academic research purposes.

3. THE ROLE OF THE SEL FRAMEWORK IN SOCIAL AND EMOTIONAL ADAPTATION

In recent years, Social-Emotional Learning (SEL) has been widely adopted as an educational strategy to promote students' mental health, emotional adaptation, and social skills. In the post-pandemic era, the importance of the SEL framework has become even more pronounced. This section explores the critical role of SEL in students' emotional adaptation and the rebuilding of social competencies, illustrating its positive impact on students' overall development through both theoretical perspectives and practical case studies.

3.1. Core Dimensions of SEL

The SEL framework encompasses five core dimensions: social awareness, interpersonal skills, self-regulation, decision-making, and self-awareness. This paper focuses on the roles of social awareness, interpersonal skills, and self-regulation in emotional adaptation and the enhancement of social capabilities.

Social Awareness: This refers to the ability to perceive others' emotions and needs, forming the foundation for empathy. In the post-pandemic era, students need to rebuild emotional connections with others and adapt to diverse social contexts (Payton et al., 2008). Social awareness helps students recognize others' emotions, alleviate social isolation, and strengthen group cohesion (Zinsser et al., 2020).

Interpersonal Skills: These include communication, conflict resolution, and teamwork. The pandemic reduced face-to-face interactions, leading to a regression in students' social abilities (Jones et al., 2017). SEL programs, through group collaboration and emotional support training, help students regain trust and address social challenges (Greenberg et al., 2017).

Self-Regulation: This refers to the ability to manage emotions and behaviors. Emotional fluctuations caused by the pandemic have posed significant challenges for students in terms of self-regulation (Zinsser et al., 2020). Through SEL, students can enhance their emotional regulation skills, cope with emotional fluctuations, and maintain psychological resilience.



3.2. Theoretical Support: CASEL Framework and Psychological Theories

The effectiveness of SEL is supported by various psychological theories. The CASEL framework proposes that the five dimensions of SEL are crucial to students' long-term success, providing tools to face challenges across academic stages (CASEL, 2020). Emotional Intelligence (EI) theory emphasizes the ability to recognize and manage emotions, aligning with the core objectives of SEL, particularly in helping students cope with complex emotional fluctuations in the post-pandemic era (Goleman, 1995). Self-Determination Theory (SDT) suggests that fulfilling needs for autonomy, competence, and relatedness fosters positive emotional and social behaviors, with SEL helping students rebuild a sense of belonging to enhance their emotional adaptation (Ryan & Deci, 2000).

3.3. Practical Cases: SEL Assisting Students in Overcoming Social Barriers and Emotional Challenges

In practice, numerous schools and educational programs have successfully applied the SEL framework to help students overcome social barriers and restore emotional adaptation. A prominent example is a middle school in the United States, which implemented a post-pandemic reintegration plan. This plan combined social skills training with emotional regulation courses, helping students adapt quickly to campus life. The course content included group collaboration, emotional support lessons, and social interaction training, which not only facilitated students in regaining trust but also enhanced their collective living abilities. A study by Greenberg et al. (2017) revealed that students participating in the SEL program showed significant improvements in social interaction and emotional regulation, particularly excelling in self-control and emotional recognition.

Another insightful case comes from a school in Finland, where activities such as "emotional diaries" and "emotional role-playing" were used to strengthen students' empathy and collaboration skills. Through these extracurricular activities, students not only improved their self-regulation and emotional recognition abilities but also exhibited stronger empathy and teamwork. Durlak et al. (2011) noted that these activities were particularly effective in helping students cope with feelings of social isolation during the pandemic. Moreover, teachers played a crucial role in this process by providing ongoing guidance and feedback, helping students restore their confidence and rebuild trust and collective consciousness with peers. Research also indicates that this emotional support not only enhanced students' emotional adaptation but also strengthened their sense of social participation in multicultural environments.

These practical cases demonstrate that SEL not only effectively restores students' social skills and emotional adaptation but also helps them regain psychological resilience and emotional stability through carefully designed activities. By combining both in-class and extracurricular approaches, SEL provides comprehensive support, enabling students to better face the emotional and social challenges of the post-pandemic era.

4. SPECIFIC STRATEGIES FOR MOVING FROM ISOLATION TO RECONNECTION

In the post-pandemic era, students face unprecedented challenges in social and emotional adaptation. Prolonged social isolation and uncertainty have intensified emotional distress, leading to profound social barriers. Educators need to adopt a variety of strategies to help students restore psychological and social balance. This section explores three key strategies: promoting social interaction, conducting emotional support activities, and leveraging the positive role of teachers.

4.1. Promoting Social Interaction: Group Projects, Collaborative Learning, and Social Activities

Social interaction is at the heart of emotional adaptation. In the post-pandemic era, educators must adopt diverse methods to restore students' social trust and sense of belonging.

Group Projects: Collaborative learning provides students with a crucial platform for interaction, especially for those who have experienced prolonged isolation. Research has shown that cooperative learning significantly enhances students' social skills and emotional adaptation (Johnson et al., 2007). For instance, Rohde et al. (2015) found that students involved in group cooperation showed substantial progress in teamwork and emotional regulation.

Collaborative Learning: Blended learning, combining both online and offline methods, has become an effective approach for many schools to restore social competencies (Baines et al., 2008). Through group discussions and online platforms, students establish deeper emotional connections, alleviating feelings of social isolation (Finkelstein et al., 2020).

Social Activities: Outdoor sports, group celebrations, and other activities offer students opportunities for face-to-face interaction, helping to alleviate the loneliness and anxiety caused by the pandemic (Perry et al., 2021). Participation in these activities helps restore students' social capabilities and emotional resilience (Zinsser et al., 2020).

4.2. Emotional Support Activities: Mindfulness Practices, Emotion Journals, and Peer Counseling

Emotional support activities assist students in regulating their emotions and enhancing emotional awareness, providing effective



coping strategies for post-pandemic challenges.

Mindfulness Practices: Mindfulness meditation reduces anxiety and depression, particularly enhancing students' emotional management in times of social uncertainty (Zenner et al., 2014). Studies show that mindfulness training improves students' self-regulation and emotional stability (González et al., 2016).

Emotion Journals: Emotion journals help students record emotional fluctuations and identify coping strategies, promoting emotional recovery and social adaptation (Harris et al., 2016). By writing, students gain clearer insights into their emotional responses and take effective action (Wilkins & Ginsburg, 2020).

Peer Counseling: Peer counseling strengthens students' emotional support networks, enhancing their social skills and emotional intelligence (Gartner et al., 2018). Research indicates that peer counseling is particularly effective in improving emotional adaptation, especially in areas such as emotional expression and communication skills (Levy et al., 2019).

4.3. The Role of Teachers: Using SEL Tools to Support Social Rebuilding and Emotional Regulation

Teachers play a pivotal role in students' social reconstruction and emotional regulation. Beyond subject teaching, they should also serve as guides and supporters of emotional development.

Designing SEL Curriculum and Activities: Teachers should integrate SEL into daily teaching by using role-play and emotional discussions to enhance students' social awareness and self-regulation skills (CASEL, 2020). For example, organizing activities focused on emotion recognition and management helps students understand and regulate their emotions, promoting emotional recovery and social adaptation.

Creating a Supportive Classroom Environment: Teachers should create a safe and accepting classroom atmosphere. Research indicates that a respectful and inclusive environment helps students build positive social relationships and enhance emotional adaptation (Wentzel, 2016). By setting clear classroom rules and providing emotional support, teachers can help students rebuild trust and restore social abilities.

Through these strategies, educators can effectively promote students' social reconstruction and emotional adaptation, supporting their recovery of healthy psychological and social states in the post-pandemic era.

5. FUTURE PROSPECTS

In recent years, Social-Emotional Learning (SEL) has gradually become a core element of global educational systems, with its significance further highlighted in the wake of the pandemic. COVID-19 not only transformed the learning environment but also impacted students' emotional health and social abilities, prompting educators to reassess the core needs of student development. In the future, SEL will not only serve as a tool for crisis management but also as a key strategy for fostering future citizens equipped with resilience, social responsibility, and emotional intelligence.

5.1. The Necessity of Long-Term Implementation: Beyond Crisis Management, Shaping Future Citizens

The value of SEL extends far beyond immediate remedial measures. It equips students with the skills needed to face the complex challenges of the future, fostering citizens with emotional intelligence and a sense of social responsibility (Goleman, 1995). In the context of increasing globalization, technological innovation, and societal complexity, SEL helps students navigate change, develop empathy, and enhance teamwork abilities, thereby contributing to social progress (Elias et al., 2015).

5.2. Policy and Resource Support: Ensuring the Widespread and Sustainable Implementation of SEL

The success of SEL relies on systematic policy support and resource allocation. Numerous successful global cases demonstrate that policy backing is critical for the widespread promotion of SEL. For instance, the U.S. "Every Student Succeeds Act" provides a legal framework and action guidelines for SEL implementation (Belfield et al., 2015). Other countries can draw on these experiences, tailoring policies to meet local needs, and ensuring the extensive implementation of SEL in schools. Teacher training plays a pivotal role in SEL programs, with research showing that teachers skilled in SEL can significantly enhance students' emotional and social abilities, as well as improve the classroom atmosphere (Domitrovich et al., 2017). Equitable distribution of educational resources is particularly important, especially in resource-scarce regions, where financial support and technological infrastructure are crucial to the sustainability of SEL programs (Jones et al., 2017).

6. CONCLUSION

The significance of Social-Emotional Learning has transcended the immediate need for post-pandemic recovery, evolving into a central strategy for cultivating future citizens. Through policy support, resource guarantees, and global collaboration, SEL not only



provides students with tools for emotional regulation and platforms for social development but also injects lasting momentum into global educational reforms. In the future, as education systems continue to evolve, SEL will play an increasingly crucial role in shaping global citizens and building harmonious societies.

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DEVELOPMENT OF WOMEN'S HOME-WORK AND HANDICRAFTS IN UZBEKISTAN IN THE PRESENT STAGE

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ANNOTATION

The purpose of this study was to analyze the conditions, achievements and prospects for the development of women's handicrafts and entrepreneurship in Uzbekistan. The objectives of the study, methods and basic concepts of small entrepreneurship are presented in the introduction.

KEYWORDS: *Traditional handicrafts, applied arts, family values, folk tales, home-based work, entrepreneurs.*

РАЗВИТИЕ ЖЕНСКОГО НАДОМНОГО ТРУДА И РЕМЕСЛЕННОСТВА УЗБЕКИСТАНА В СОВРЕМЕННОМ ЭТАПЕ

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Аннотация

Целью данного исследования являлись анализ условий, достижений и перспектив развития женского ремесленничества и предпринимательства в Узбекистане. Задачи исследования, методы и основные понятия малого предпринимательства представлены во введении.

Ключевые слова: *Традиционное ремесленничество, прикладное искусство, семейные ценности, народные предания, надомный труд, предприниматели.*

Uzbek culture is rich in a wide range of traditional crafts. Crafts are usually passed down from generation to generation in one family or region. Distinctive indicators are not only the technique and style of original creativity, but also the masters themselves. Traditionally, there is applied art, which is exclusively practiced by women. For many centuries, craftswomen have been engaged in decorative and applied art, investing in it family values, folk legends and a piece of their soul.

In Uzbekistan, the share of women in entrepreneurship is 25 percent of the total number of small business representatives. One of the priority tasks facing this sector is to bring the share of compatriots among business entities to 40 percent. To do this, it is necessary to create favorable conditions.

After Uzbekistan gained independence, one of the first steps in protecting women's rights was the recognition in Article 46 of the Constitution of the Republic of Uzbekistan: "Women and men have equal rights." At the same time, women in our country have a legal guarantee that they will participate in all spheres of life as active members of society. Taking into account the active participation of women in the implementation of democratic socio-political and socio-economic reforms in our country in recent years, to ensure a further increase in the socio-political and social activity of women, to create conditions for the realization of their abilities and opportunities in various spheres and industries, ensuring unconditional observance of rights and legitimate interests, comprehensive support for motherhood and childhood, as well as extensive work to strengthen the institution of the family. increases.



Under the conditions of the former Soviet system, women entrepreneurs and artisans were viewed not as workers, but as middlemen and speculators. But despite this, over the years, home work and handicrafts have become the norms of life of the Uzbek people, served as the basis for the development of medium and small layers of private entrepreneurship.

Since ancient times, the Uzbek people have been famous throughout the world for their national crafts. Today, tourists coming from different countries, foreign investors and businessmen are increasingly attracted to this fabulously beautiful land. On the one hand, they come to see historical monuments, on the other hand, to get to know folk crafts based on manual labor.

Headdresses embroidered by the hands of Uzbek women, woven various silk fabrics amaze with their unique color.

A modern woman demonstrates her broad abilities and talents in various sectors of the national economy. If on the one hand she does not hesitate to enter the sphere of national crafts such as pottery, fine art, sculpture, miniature and others, then on the other hand, widely and effectively using the opportunities, diligently develops agriculture, produces consumer goods, improves the sphere of household services.

The creation of grant funds, preferential loans by the state, the development of various projects aimed at the development of private business and entrepreneurship, the publication of legislative documents to support the economic activity of women, have given great changes in the social life of women in Uzbekistan.

In recent years, directly on the initiative of the head of state, a lot of work has been done in our country to ensure the rights and interests of women, create decent working and living conditions for them, and realize their abilities and potential. Resolution of the President No. PQ-401 of 21.12.2023 "On additional measures to reduce the need for a family and increase the activity of women and girls" was adopted.

The Republican Commission on the Role of Women in Society, Gender Equality and Family Issues and the Cabinet of Ministers on the issue of women among senior personnel in each government agency, organization and enterprise at all levels, including local executive authorities, the judicial system and law enforcement agencies. The requirement to increase its share to 30% by 2030 consists in the formation of executive bodies of state enterprises, including boards of directors and supervisory boards. was instructed to ensure its implementation (21.12.2023 PF-208-No.).

From February 1, 2024, in order to create, develop, improve and provide methodological support to women starting a new business in the field of housekeeping and crafts, Vocational training courses are organized at the expense of funds. At the same time, the state covers 70 percent of the training costs of each graduate studying in a specialty in educational institutions, but not more than 5 times the BHM. After state registration, unemployed women as a business entity (production and sale of modern national costumes) will be reimbursed from January 1, 2024, for the rent of a building and structure for the first three months in the amount of up to 10 times the BHM. The funds are allocated by the Fund for Involving the Population in Entrepreneurship and Home Work.

From January 1, 2024:

- women are allowed to work as managers in self-government bodies of citizens on the basis of paid community service for a period of up to 11 months;
- persons in need of social protection, whose jobs are reserved by an organization (employer), who are experiencing difficulties in finding work and are unable to compete equally in the labor market, include persons who have suffered from violence due to family (domestic) reasons;
- it is allowed to purchase building materials for the renovation of houses of women in need of social protection, by selecting the best offers.

Also, based on advanced foreign experience, a corps of judges specializing in family disputes will be formed in inter-district civil courts.

The following was confirmed:

- Projected indicators of women's professional training and employment in 2024-2025;
- List of information from ministries and departments to be integrated into the "Unemployed Women" module;
- "Roadmap" for strengthening the family, realizing the legitimate interests of women, increasing their socio-political activity and employment, developing entrepreneurial skills and ensuring their equality.

The importance of involving women in the business environment is recognized throughout the world today. At the 74th session of the UN General Assembly, the Women's Entrepreneurship Support Program was created and launched. The purpose of the document is to maximize the impact of women's entrepreneurship on achieving the Sustainable Development Goals by creating a favorable ecosystem for women entrepreneurs around the world.



The existing conditions and prospects for the development of the business climate in Uzbekistan significantly affect the development of women's entrepreneurship, which has begun to be recognized as an important factor in ensuring the economic growth of the state. Women in Uzbekistan are quite an active part of the small business, contribute to the development of the economy in the field of trade, services, small-scale production, and make a tangible contribution to ensuring employment. Although official statistics do not reflect the share of women entrepreneurs in economic indicators, the results of our study confirm that their role and contribution to the development of the small business sector and the entire economy as a whole can and should be assessed and recognized.

In short, all conditions have been created in Uzbekistan for women engaged in home-based work. They are supported by the state, they are given loans for the development of small businesses, their work activity is noted in the work book and is taken into account when they retire.

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A COMPREHENSIVE REVIEW ON THE PHYTOCHEMISTRY AND THERAPEUTIC APPLICATIONS OF WITHANIA COAGULANS (PANEER DODA)

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ABSTRACT

Withania coagulans, commonly known as Paneer Doda or Indian Rennet, is a medicinal plant of the Solanaceae family widely used in traditional medicine for its therapeutic properties. This plant is rich in phytochemicals such as withanolides, flavonoids, saponins, and alkaloids, which contribute to its pharmacological activities, including antidiabetic, anti-inflammatory, antioxidant, hepatoprotective, and immunosuppressive effects. It has applications in treating diabetes, hyperlipidemia, cancer, wound healing, and inflammatory conditions. This review highlights the botanical characteristics, phytochemical constituents, and pharmacological activities of Withania coagulans, emphasizing its potential in modern medicine and pharmaceutical formulations.

INTRODUCTION

The science of life is known as Ayurveda. In Ayurveda, plants are the primary source of medicine for treating and preventing diseases and maintaining a healthy lifestyle ^[1]. Many plants in the natural system of medicine must have a wide range of biological activities. Withania is a minor genus in the Solanaceae family of shrubs (which has about 2000–3000 species divided around 90 families) ^[2]. Withania species, from the East Mediterranean to South Asia, may be found worldwide. Withania coagulans and Withania somnifera are two species found in Pakistan ^[2]. Withania is a flowering plant of the Solanaceae family with roughly 23 species endemic to North Africa, the Middle East and the Canary Islands ^[3]. In various sections of Afghanistan, Pakistan, India, and Nepal, W.coagulans is prevalent. It may be found in Punjab, Rajasthan, Simla, Kumaun and Garhwal in India ^[4].



Fig. 1: Fresh plant of W. Coagulans

**Fig. 2: Dry Fruits of W. Coagulans**

The seeds are used to cure liver problems, piles, ophthalmia and as an emmenagogue and diuretic. They are used as blood purifier and used in nervous exhaustion, insomnia, impotence, dyspepsia, flatulent and intestinal infections^[5]. Milk coagulation can be achieved by the berries of the shrub. Milk coagulation is only caused by aspartic protease, as determined by mass spectrometry 2 analysis of purified protease and enzyme assays carried out in the presence of protease inhibitors .^[6,7] Chewing on twigs can help with tooth cleaning and inhaling the plant's smoke can ease toothache pain. W. coagulans flowers are used to cure diabetes; locally, leaves and roots are utilised to cure a range of diseases.^[8] Anti-mutagenic, antioxidant, antidiabetic, anti-microbial, anti-fungal, anti-bacterial, anti-hyperglycemic and anti-cancer effects have been found for W. coagulans fruit extracts^[9,10] The main active chemical constituents of plant are alkaloids, carbohydrates, phenolic compounds, steroids, tannins, amino acids, organic acids, withacoagin, withaferin, essential oils, flavonoids, vitamin, triterpenes etc.^[11,12] Withania coagulans as a coagulant for tofu production by assessing its impact on quality and sensory properties.^[10]

Taxonomical Classification: ^[13]

- Kingdom: Plantae
- Division: Magnoliophyta
- Order: Solanales
- Family: Solanaceae
- Genus: Withania

Botanical description of Withania Coagulans

- Botanical Name : Withania coagulans Dunal
- Family : Solanaceae
- Subfamily : Solanoideae
- Tribe : Physaleae
- Subtribe : Withaninae
- Sanskrita Name : Rishyagandha 1&2
- Hindi Name : Punir, Punir bandh, Akri, Binputakah, Paneer doda
- English Name : Indian Cheese maker, Indian Rennet, Vegetable Rennet
- Trade Name : Paneer dodi, Panner, doda, Panir bed, Paneer dhodi.

Vernacular Name of Withania coagulans : ^[15]

- Bengal - Asvagandha
- Bombay – Kaknaji
- Gwalior - Asgandha
- Panjab - Khamjaria, Khamjira,
- Panir Sindhi - Punirjafota, Punirband
- Persian - Kaknaje hindi,
- Punirbad Arabic - Javzulmizaja,
- Kaknaje hindi Canares - Asvagand
- Telgu - Panneru-gadda



➤ Urdu - Hab kaknaj

Geographical Description^[36]: It is found in the Eastern Mediterranean region and extends northern Africa to Southwest Asia. Across India, it grows in drier regions such as Punjab, Gujarat, Rajasthan, Shimla, Kumaon, and Garhwal.

Morphological Discription^[16]

A rigid grey- tomentose undershrub 0.3-0.9 m. high, branches terete, clothed with dense grey or yellowish white tomentum. Leaves : 2.5-5.7 by 1-2.2 cm., lanceolate-oblong, obtuse, entire, clothed with a persistent not easily detachable greyish tomentum, of a uniform colour on both sides, thick, more or less rugose, base acute, running down into an often obscure petiole; petiole 6 mm. long but often indistinct. Flowers : Dioecious, in axillary clusters; pedicles 0-6mm. long, deflexed, slender. Calyx 6 mm. long, campanulate, clothed with fine stellate grey tomentum; teeth triangular, 2.5 mm. long. Corolla 8 mm. long, stellately mealy outside, divided about 1/3 the way down; lobes ovate-oblong, subacute. Male flowers: Stamens about level with the top of the corolla-tube; filaments 2 mm. long, glabrous; anthers 3-4 mm. long. Ovary ovoid, without style or stigma. Female flowers: Stamens scarcely reaching ½ way up the corolla-tube; filaments about 0.85 mm. long; anthers smaller than in the male flowers, sterile. Ovary ovoid, glabrous; style glabrous; stigma mushroom-shaped, 2-lamellate. Fruits : Berry 6-8 mm. diam., globose, smooth, closely girt by the enlarged membranous calyx which is scurfy pubescent outside. Seeds 2.5-3 mm. diam., somewhat ear-shaped, glabrous. Seeds : 2.5-3mm diam., dark brown, ear-shaped, glabrous; Flowering period: from January to April and berries ripen during January to May. The natural regeneration is from seed.

Microscopic Characters^[17]

The pedicel's outer layer, the epidermis, consists of rectangular to slightly elongated cells with a smooth cuticle. Below the epidermis lies the cortex, composed of parenchymatous cells. These cells are thin-walled and store various nutrients. The vascular bundles are arranged in a ring and include both xylem and phloem. The xylem vessels are thick-walled and lignified, while the phloem consists of thin-walled sieve elements and companion cells. At the center of the pedicel is the pith, made up of large parenchymatous cells shown in Figure 3 (i). The calyx's outermost layer consists of polygonal cells with a thick cuticle. Trichomes (hair-like structures) are often present and can be unicellular or multicellular. The internal tissue of the calyx, the mesophyll, is divided into palisade and spongy parenchyma shown in Figure 3 (iii). The palisade cells are elongated and arranged tightly, while the spongy parenchyma cells are more loosely packed. The vascular bundles are scattered throughout the mesophyll and contain xylem and phloem tissues. The xylem vessels are thick-walled, and the phloem elements are thin-walled. The outer layer of the seed is the testa, which consists of several layers of cells. The outermost layer is composed of thick-walled sclerenchymatous cells that provide protection. The endosperm is a nutritive tissue inside the seed, composed of thin-walled parenchymatous cells. It is rich in starch and oils. The embryo is the young plant inside the seed, consisting of embryonic root (radicle), shoot (plumule), and cotyledons (seed leaves). The cells of the embryo are meristematic, meaning they have the capacity to divide and differentiate shown in Figure 3 (iv). The outermost layer of the pericarp is the epicarp, made up of polygonal cells with a thick cuticle. It may also have trichomes. The middle layer of the pericarp, the mesocarp, consists of parenchymatous cells that are thin-walled and store nutrients. Vascular bundles are present within this layer. The innermost layer of the pericarp, the endocarp, is composed of thick-walled sclerenchymatous cells shown in Figure 3 (ii) that provide protection to the seed shown in Table 1.

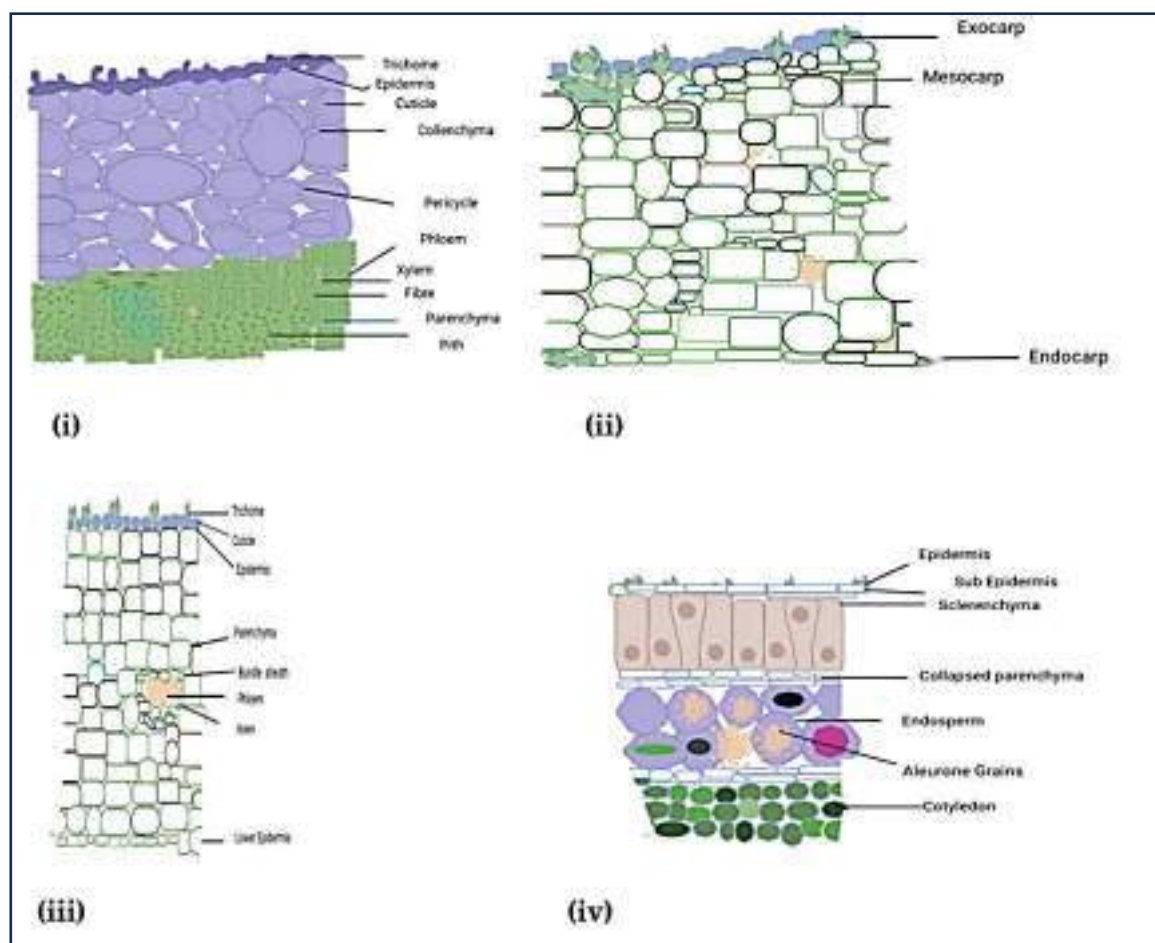


Figure 3: (i) Transverse section of Pedicle. (ii) Transverse section of Pericarp (Fruit wall). (iii) Transverse section of calyx. (iv) Transverse section of Seed.

Part Used	Microscopic Characters	References
Pedicel	A single layer of tabular cells with many branching and unbranched trichomes covers the epidermis in the transverse section of the pedicel. This is followed by a cortex consisting of five to ten layers of collenchymatous cells. The pericycle has parenchymatous cells interspersed with pericyclic threads. The pericycle has parenchymatous cells interspersed with pericyclic threads. The xylem in the central region is bordered by a narrow band of phloem, which is enclosed by a ring of intra-xylary phloem. Parenchymatous cells encircle the hollow pith in the core and a few lignified fibres with robust walls that point in the direction of the phloem are visible	19,20
Calyx	The calyx's bottom epidermis is made up of a single layer of thin-walled cells, while the upper epidermis has a few branching and unicellular covering trichomes. The mesophyll is made up of spongy parenchyma that is crossed by several tiny veins and wrapped in bundle sheath cells made of thin-walled parenchymatous cells	19,20
Pericarp	The transverse section reveals a large zone of parenchymatous cells with significant cellulose thickening may be seen in the mesocarp of the pericarp (fruit wall). The exocarp, which is composed of a single layer of cells, is also visible. An isolated layer of cells makes up the endocarp.	19,20

**CHEMICAL CONSTITUENT**

Plant Part	Chemical Constituent	Specific Chemicals	Role
Fruits	Withanolides	- Coagulin F (27-hydroxy-14,20-epoxy-1-oxo-(22R)-witha-3,5,24-trienolide) - Coagulin G (17beta,27-dihydroxy-14,20-epoxy-1-oxo-(22R)-witha-2,5,24-trienolide) - Withacoagulin (20(β)-hydroxy-1-oxo-(22R)-witha-2,5,24-trienolide)	These steroidal lactones exhibit anti-inflammatory, anti-cancer, and adaptogenic properties. They help regulate stress responses and enhance immunity.
	Esterases	- Various esterase enzymes	Facilitate milk coagulation, essential for cheese-making processes.
	Free Amino Acids	- Proline - Tyrosine - Glycine	Important for protein synthesis and metabolic functions.
	Fatty Acids	- Linoleic acid (C18H32O2) - Oleic acid (C18H34O2)	Essential for maintaining cell membrane integrity and providing energy; have anti-inflammatory effects.
	Alkaloids	- Withanine	Exhibits analgesic and anti-inflammatory effects; used in traditional medicine.
Leaves	Phenolic Compounds	- Flavonoids (e.g., quercetin)	Antioxidants that reduce oxidative stress and inflammation.
	Tannins	- Various tannins	Possess astringent properties; inhibit microbial growth and may aid in digestive health.
	Saponins	- Various saponins	Lower cholesterol levels and exhibit immune-boosting properties; may induce apoptosis in cancer cells.
	Proteins	- Enzymes and structural proteins	Essential for growth, repair, and maintenance of body tissues.
Whole Plant	Carbohydrates	- Polysaccharides (e.g., cellulose)	Provide energy; contribute to dietary fiber promoting digestive health.
	Vitamins	- Vitamin C (ascorbic acid)	Important for immune function and antioxidant protection against cellular damage.
	Minerals	- Calcium (Ca) - Iron (Fe)	Essential for various bodily functions including bone health (Calcium) and oxygen transport (Iron).

**FORMULATION TABLE** ^[21,22]

Ingredients	F1	F2	F3	F4	F5	F6
<i>Azadirachta Indica</i>	60	60	60	60	60	60
<i>Withania Coagulans</i>	60	60	60	60	60	60
<i>Picrorhiza Kurroa</i>	60	60	60	60	60	60
<i>Pterocarpus Marsupium</i>	60	60	60	60	60	60
<i>Lactose / Mannitol</i>	235	225	215	205	195	185
<i>Pregelatinised Starch</i>	0	10	20	30	40	50
<i>Talc</i>	20	20	20	20	20	20
<i>Sodium Benzoate</i>	5	5	5	5	5	5
<i>Total (Mg)</i>	500	500	500	500	500	500

Table 1: Formulation of Anti-Diabetic Tablet

Ingredients	F1	F2	F3	F4	F5	F6
<i>Plant Extract</i>	300	300	300	300	300	300
<i>Carbopol</i>	20	30	40	-	-	-
<i>Ethyl cellulose</i>	-	-	-	20	30	40
<i>Microcrystalline cellulose</i>	40	40	40	40	40	40
<i>Dibasic calcium phosphate</i>	30	20	10	30	20	10
<i>PEG 4000</i>	10	10	10	10	10	10
<i>Methyl Paraben</i>	0.1	0.1	0.1	0.1	0.1	0.1
<i>Weight per tablet (Mg)</i>	400	400	400	400	400	400

Table 2: Formulation of Anti-Diabetic Tablet**PHARMACOLOGICAL USES**

- Antihyperglycemic activities:** Diabetes can be effectively managed with *Withania coagulans* since it exhibits hypoglycemic properties, which is a safe and effective alternative treatment option ^[36]. An aqueous extract of *Withania coagulans* berries (1gm/kg; P.O.) significantly lowers vital signs, serum glucose, and lipid peroxide. It promotes the correct amount of insulin secretion. *Withania coagulans* improve glucose utilization and carbohydrate metabolism, thereby depleting blood glucose. Hyperglycaemia is reduced due to it ^[37]. Treatment with coagulanolide alongside four known withanolides 1-3 and 5 isolated from four fruits of *W. coagulans*, shows significant inhibition on the postprandial rise in hyperglycemia post sucrose load in normoglycemic rats also as streptozotocin-induced diabetic rats ^[38]. Hence, *Withania coagulans* is considered an antihyperglycemic and antidyslipidemic agent ^[39]. *Withania coagulans* are commonly used in the management of type-2 diabetes mellitus ^[40].
- Antihyperlipidemic activities:** In high-fat diet-induced hyperlipidemic rats, extracts of *Withania coagulans* fruits significantly reduced levels of elevated serum cholesterol, triglyceride, lipoprotein, and therefore LPO levels. Ayurvedic products containing *Commiphora Mukul* are analogous to the hypolipidemic effect of fruits of *Withania coagulans* ^[41].
- Anti-inflammatory activities:** *Withania coagulans* alcoholic extract has a significant anti-inflammatory effect in acute inflammation induced by egg albumin [42,43]. Withanolides from *Withania coagulans* are effective in reducing inflammation in acute inflammation [44]. The hydroalcoholic extract of *Withania coagulans* berries exhibits significant anti-inflammatory activity in a carrageenin induced rat paw edema model [45].
- Antifungal and antibacterial effects:** *Micrococcus pyrogens* var. *aureus* vibrio cholera is inhibited by the volatile oil produced by steam distillation of the petroleum ether extract of the fruits. Two new withanolides 14,15 β epoxywithanolides I [(20S, 22R) 17 β ,20 β -dihydroxy-14 β ,15 β -epoxy-1-oxo-witha-3,5,24 trienolides] and 17 β -hydroxy withanolides K [(20S,22R)14 α ,17 β ,20 β -trihydroxy-1-oxo-witha-2,5,24-trien-olide], isolated from ethanolic extract of whole plant *Withania coagulans* found to move against a variety of potentially pathogenic fungi [45].
- Cardiovascular Effects:** Withanolide, a steroidal lactone derived from the aqueous extract of Paneer Dodi fruits, has a cardiovascular effect [46,47]. This withanolide replacement, isolated from the fruits of *Withania coagulans*, has a similar chemical structure to the aglycones of cardiac glycosides [48]. Withanolide produced a moderate fall in blood pressure in dogs (34 $\pm$ 2.1, mm Hg), which was blocked by atropine and not by mepyramine or propranolol at doses of 5 mg/kg body weight.



It produces a myocardial depressant effect in rabbit Langendorff or preparation of ECG studies but produces mild positive inotropic and chronotropic effects in perfused dogs' hearts [49].

6. **Immunosuppressive Effects:** Withanolide E and Ashwagandha possess specific immunosuppressive properties on human B and T lymphocytes as well as mice thymocytes[50]. Withanolides, such as coagulin-H, acts on several cellular functions involved in immune responses, including lymphocyte proliferation and interleukin-2 (IL-2) cytokine expression [51]. It is comparable to the effects of prednisolone. The coagulin-H possesses a strong inhibitory effect on lymphocyte proliferation, and therefore, cytokine production by Th-1 cells. Coagulin-H inhibits phytohaemagglutinin (PHA)-induced T-cell motivation[52].
7. **Antimutagenic and anticarcinogenic effects:** The genotoxicity of herbal drugs is determined by their phytoconstituents. Withania coagulans contain withanolides, which have antitumor properties, as well as flavonoids that exert antimutagenic and anticancer effects [53]. The antimutagenic properties of Withania coagulans remain unknown. Withania coagulans extract cyclophosphamide-induces micronucleus formation in mice bone marrow cells. The results show that a single i.p. injection of Withania coagulans fruits extracts at doses of 500,1000,1500 mg/kg weight before 24 hours effectively reduces micronucleus development in bone marrow cells of mice in a dose dependent manner as compared to the cyclophosphamide group [55]. The plant is ethnobotanically reported in cancer treatment [54].
8. **Hepatoprotective Activity:** In adult albino rats, 3-hydroxy-2, 3-dihydro-withanolide F derived from a fruit of Withania coagulans has been shown to have hepatoprotective effects against CCl₄-induced hepatotoxicity. A weight-based comparison revealed that it is more active than hydrocortisone and exhibits a marked protective effect [57].
9. **Antitumor properties:** Withaferin (3 β -hydroxy-2, 3-dihydro-withanolide F) exhibits antitumor effects. Withania coagulans aqueous extract has anticyto toxic properties. The extract shows the remarkable inhibitory activity of DMSO-induced cytotoxicity and decreases in TNF- α production in chicken Lymphocytes [56].
10. **Wound healing activity:** A study suggests the wound healing activity of Withania coagulans in streptozotocin-induced diabetic rats. In both topical and oral forms, hydro-alcoholic fractions of the methanolic extract (standardized by withaferin A) of Withania coagulans increase the rate of wound contraction. Withaferin-A enhances collagen, protein, DNA, SOD, and CAT levels, and decreases the levels of hexosamine [59]. Hydroalcoholic fractions of Withania coagulans methanolic extract sort of 10 %w/w ointment were applied topically and orally at a dose of 500mg/kg weight to streptozotocin-induced diabetic rats [58]. In models of open and incised wounds, the aqueous-methanolic phase of the methanolic extract of Withania coagulans has shown significant wound healing activity. It accelerates collagen, mucopolysaccharides, DNA, and protein synthesis [60].
11. **Anti-arteriosclerosis Activity:** The aqueous extract of Withania coagulans also exhibits radical scavenging activity in an in vitro system using DPPH and. Aqueous extract of fruits of Withania coagulans has antioxidant potential against several diseases like aging, atherosclerosis, etc[61].
12. **Anthelmintic activity:** In the steam distillation of the petroleum ether extract of Withania coagulans fruits, essential oil appears to possess anthelmintic properties. The upper parts of Withania coagulans have anthelmintic activity in ruminants [62].
13. **Diuretic activity:** Withania coagulans fruits exhibit diuretic potential in an aqueous extract when studied in rats. When compared with other Withania species, Withania coagulans have more polar Withanolides[64]. Using furosemide as a standard, the diuretic activity of the aqueous extract of paneer Dodi roots can be studied in the Lipschitz test model. The results showed significant increases in urine volume by 71.02% and 79.12% at 500mg/kg and 75mg/kg weight dosages, respectively, when compared to regulate. Urinary electrolyte excretion where increases in both the dosage compared to regulate. The diuretic effect is due to the presence of the active principles of polar nature, of which withanolides are the chemical protagonists. Research supports the use of Withania coagulans as a diuretic agent in folk medicine [63]. Withania coagulans extract has hypotensive, respiratory stimulant, and muscle relaxing properties [38].

Toxicology: When the body is exposed to medications or poisons, nephrotoxicity is a common adverse outcome. It leads to uremia due to a failure of the kidneys to filter excess urea, nitrogenous substances, and creatinine. There is no specific treatment for acute renal failure; only supportive care is required to restore renal function. This condition can only be avoided by avoiding nephrotoxic substances and maintaining adequate hydration and perfusion.



EVALUATION PARAMETERS

1. Pre-Formulation Studies^(34,35)

Flow Properties: Evaluate the physical properties of the capsule's powder to ensure proper filling and handling during manufacturing.

Bulk Density & Tapped Density: Measure the volume occupied by the powder under standard and compressed conditions.

Carr's Index: Indicates compressibility, calculated from bulk and tapped density values.

Hausner's Ratio: Measures flow efficiency, derived from bulk and tapped density.

Angle of Repose: Determines the powder's flowability; lower angles indicate better flow properties.

2. Organoleptic Properties^(33,35)

Appearance: Capsules should be visually inspected for uniformity in size, shape, and color.

Odor and Taste: Ensures that the capsule masks any unpleasant characteristics of the active pharmaceutical ingredients (APIs) to improve patient compliance.

3. Weight Uniformity^(34,35)

- Capsules from a batch are weighed individually, and the average weight is calculated. Variations must fall within pharmacopoeial limits to ensure consistent dosing.

4. Disintegration Time⁽³⁴⁾

- Measures the time taken for capsules to break apart in simulated gastrointestinal fluids. This test ensures the release of the drug within an acceptable time frame for therapeutic efficacy.

- Performed using disintegration testing equipment.

5. Dissolution Profile^(33,34)

- Evaluates how quickly the active ingredients are released from the capsule into a dissolution medium (simulating body fluids).

Method: Carried out using a dissolution apparatus at 37°C with specified media and stir rates.

Sampling: Periodic sampling followed by analysis using spectrophotometry or HPLC

6. Moisture Content^(33,34)

- Ensures that the powder inside the capsules is dry to prevent clumping, microbial growth, or degradation of active ingredients.

Method: Measured using techniques like Karl Fischer titration or loss on drying.

7. Phytochemical Screening^(34,35)

- Confirms the presence of key active compounds such as:

- Alkaloids: Tested using Mayer's or Wagner's test.

- Flavonoids: Confirmed using HPTLC fingerprinting or colorimetric assays.

- Glycosides, Tannins, and Saponins: Identified using standard phytochemical tests.

8. Bioactivity Studies⁽³⁴⁾

- In Vitro Antidiabetic Assays:

- **Alpha-Amylase Inhibition:** Tests the ability of the capsule contents to inhibit the enzyme alpha-amylase, simulating the reduction of glucose absorption in the gut.

- **Procedure:** Incubation of the capsule's powder with starch solution and alpha-amylase, followed by measuring the reaction using DNSA and UV spectrophotometry.

- **Alpha-Glucosidase Inhibition:** Similar test for assessing the inhibition of carbohydrate breakdown enzymes.

9. Stability Testing^(34,35)

- Conducted under accelerated conditions (temperature, humidity) to check the integrity of the capsule over time.

parameters: Physical appearance, weight, dissolution, and potency are evaluated periodically.

10. Microbial Testing^(33,34)

- Assesses contamination levels to ensure the product is safe for consumption.

- Total Viable Count (TVC): Measures bacterial and fungal contamination.

- Specific Pathogens: Checks for harmful bacteria like *E. coli*, *Salmonella*, etc.

11. High-Performance Thin Layer Chromatography (HPTLC)⁽³⁴⁾

- Used to fingerprint the active compounds in the formulation (e.g., flavonoids, saponins) to ensure consistency across batches.

**12. FTIR Analysis⁽³⁴⁾**

- Identifies functional groups in the active ingredients, ensuring the presence of expected compounds (e.g., phenolic groups in antidiabetic herbal extracts).

CONCLUSION

Withania coagulans is a promising medicinal plant with diverse pharmacological applications rooted in traditional medicine. Its phytochemical diversity and therapeutic efficacy make it an essential candidate for developing herbal remedies and pharmaceutical formulations. Further research is needed to standardize its extracts, validate its clinical efficacy, and ensure its safe incorporation into modern healthcare practices. By bridging the gap between traditional knowledge and scientific validation, *Withania coagulans* could play a vital role in addressing contemporary health challenges.

Conflict Of Interest

The Authors declared that they do not have any conflict of interest.

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A UPDATED REVIEW ON EXPLORING THE ROLE OF MEDICINAL PLANTS IN SCALP AND HAIR WELLNESS

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ABSTRACT

*This review comprehensively explores the traditional and modern applications of medicinal plants in promoting scalp and hair health, emphasizing their pharmacological properties, bioactive compounds, and therapeutic efficacy. The plants reviewed include Reetha (*Sapindus mukorossi*), Fenugreek (*Trigonella foenum-graecum*), Orange Peel (*Citrus sinensis*), Flaxseed (*Linum usitatissimum*), Hibiscus (*Hibiscus rosa-sinensis*), and Castor Oil (*Ricinus communis*). These botanicals, each with a unique profile of bioactive compounds such as saponins, flavonoids, fatty acids, and antioxidants, have demonstrated multifaceted benefits for hair care. Reetha acts as a natural cleanser, Fenugreek stimulates hair growth and prevents hair loss, while Orange Peel promotes scalp health with its antioxidant-rich content. Flaxseed provides nourishment to hair follicles, Hibiscus enhances hair strength and shine, and Castor Oil improves thickness and reduces hair breakage.*

The review emphasizes the ability of these plants to address common hair and scalp concerns such as dryness, dandruff, hair fall, and weak strands through their cleansing, moisturizing, antimicrobial, and anti-inflammatory properties. Unlike synthetic hair care solutions, these natural remedies are eco-friendly, cost-effective, and gentle on the scalp. By bridging traditional knowledge with modern pharmacological studies, this work highlights their mechanisms of action and potential applications in sustainable personal care products. Furthermore, it identifies gaps in current research and advocates for the standardization of formulations and clinical trials to validate these remedies' efficacy and safety. This review not only reinforces the relevance of medicinal plants in hair care but also supports the growing trend toward natural and comprehensive wellness practices.

INTRODUCTION

The use of medicinal plants in hair care has a rich history across diverse cultures, driven by their effectiveness in maintaining and enhancing hair health. For generations, people have turned to nature for solutions to common hair problems, such as hair loss, dandruff, dryness, and weak hair strands. Unlike synthetic hair products that often contain harsh chemicals, natural remedies derived from plants are gentle, eco-friendly, and rich in bioactive compounds that support hair vitality. Among the most notable botanicals used in traditional and modern hair care are Reetha (*Sapindus mukorossi*), Fenugreek (*Trigonella foenum-graecum*), Orange Peel (*Citrus sinensis*), Flaxseed (*Linum usitatissimum*), Hibiscus (*Hibiscus rosa-sinensis*), and Castor Oil (*Ricinus communis*). These plants are renowned for their specific benefits, such as cleansing the scalp, promoting hair growth, reducing dandruff, and improving hair texture and shine. For example, Reetha, commonly known as soapnut, is rich in saponins, which provide natural cleansing and antimicrobial properties. Fenugreek seeds are a powerhouse of nutrients, including proteins and flavonoids, that stimulate hair growth and reduce hair fall. Similarly, Orange Peel's high vitamin C content promotes collagen production, strengthening hair follicles. Flaxseed, with its omega-3 fatty acids, nourishes the scalp and prevents hair thinning. Hibiscus is celebrated for its ability to stimulate hair growth and combat dandruff, while Castor Oil deeply moisturizes hair, reducing breakage and improving thickness.

These botanicals not only address the root causes of hair issues but also offer a holistic approach by improving scalp health and supporting overall wellness. Their versatility in forms such as oils, powders, masks, and rinses make them accessible for various hair care routines. This review explores the properties of these plants, their traditional uses, and the science behind their effectiveness in hair care. By bridging traditional knowledge with modern research, this paper aims to highlight the potential of natural botanicals as sustainable and effective solutions for hair health.

Plant Profile

1) Reetha (*Sapindus Mukorossi*)

Reetha (*Sapindus mukorossi*), commonly known as soapnut or Indian soapberry, belongs to the family Sapindaceae and is widely valued for its versatile applications in traditional medicine, cosmetics, and sustainable cleaning solutions. Native to tropical and subtropical regions, particularly India and Nepal, it thrives in warm climates with well-drained soils and moderate rainfall. This deciduous tree grows up to 20 meters, with pinnate leaves, small yellowish flowers, and round, wrinkled fruits rich in saponins—a natural surfactant responsible for its cleansing properties. [1]



Reetha is extensively used in hair care due to its gentle cleansing and conditioning properties, helping to remove excess oil, prevent dandruff, and promote strong, shiny hair. It is a key ingredient in natural shampoos and herbal hair masks. Besides hair care, it is used in eco-friendly detergents, shampoos, and skincare products and has medicinal benefits like antibacterial and anti-inflammatory effects. Its cultivation involves seed propagation, with fruits typically harvested in winter. A symbol of sustainability, reetha plays a vital role in promoting chemical-free and environmentally conscious lifestyles.[2]

Botanical Classification

Category	Details
Kingdom	Plantae
Subkingdom	Tracheobionta
Superdivision	Spermatophyta
Division	Magnoliophyta
Class	Magnoliopsida
Subclass	Rosidae
Order	Sapindales
Family	Sapindaceae
Genus	<i>Sapindus</i>
Species	<i>Sapindus mukorossi</i>

Table 1: Botanical Classification of Reetha.



Fig 1: Reetha Powder

Botanical Description: [3]

Reetha, commonly known as Indian Soapnut, is a plant of significant ethnobotanical and commercial importance. Below is a detailed botanical description is given.

- Habit**
Sapindus mukorossi is a medium to large-sized deciduous tree, growing up to 20 meters in height with a spreading crown.
- Leaves**
Pinnately compound leaves, 30–50 cm long, alternate in arrangement. The leaflets are lanceolate, smooth, and shiny with entire margins.
- Flowers**
Small, bisexual, or unisexual, pale greenish-white flowers arranged in terminal or axillary panicles. The flowers are fragrant and bloom during the summer months.
- Fruit**
The fruit is a round, fleshy drupe, about 1.5–2.5 cm in diameter. When ripe, it turns yellowish to reddish-brown. The fruit contains a single black, hard seed.
- Bark**
The bark is smooth, light brown, and exfoliating in mature trees.
- Roots**
Taproot system, anchoring the tree deeply into the soil.
- Special Features**
The fruit is rich in saponins, which produce a natural lather when in contact with water, making it a popular natural detergent and cleansing agent.

Vernacular names: [4]

Language	Vernacular Names
English	Soapnut, Reetha, Indian Soapberry
Hindi	Reetha, Aritha, Ritha, Aritak
Sanskrit	Arishtak, Reetha, Ritha, Dharmashakti
Bengali	Ritha, Reetha, Aritha
Tamil	Kottamalli, Aritha, Kottamalli Muthu, Aritham
Telugu	Ritha, Poondur, Aritha, Ritha Kottamalli
Gujarati	Ritha, Aritha, Ritho, Kottamalli, Rithaka
Kannada	Aritha, Kottamalli, Kottamalle, Arithaa
Marathi	Reetha, Ritha, Kottamalli
Punjabi	Reetha, Ritha, Aritha, Kottamalli, Poondur
Malayalam	Aritha, Kottamalli, Reetha, Poondur, Kottamalliyam
Urdu	Reetha, Aritha, Ritha

Table 2: Vernacular names of Reetha.



Geographical Source

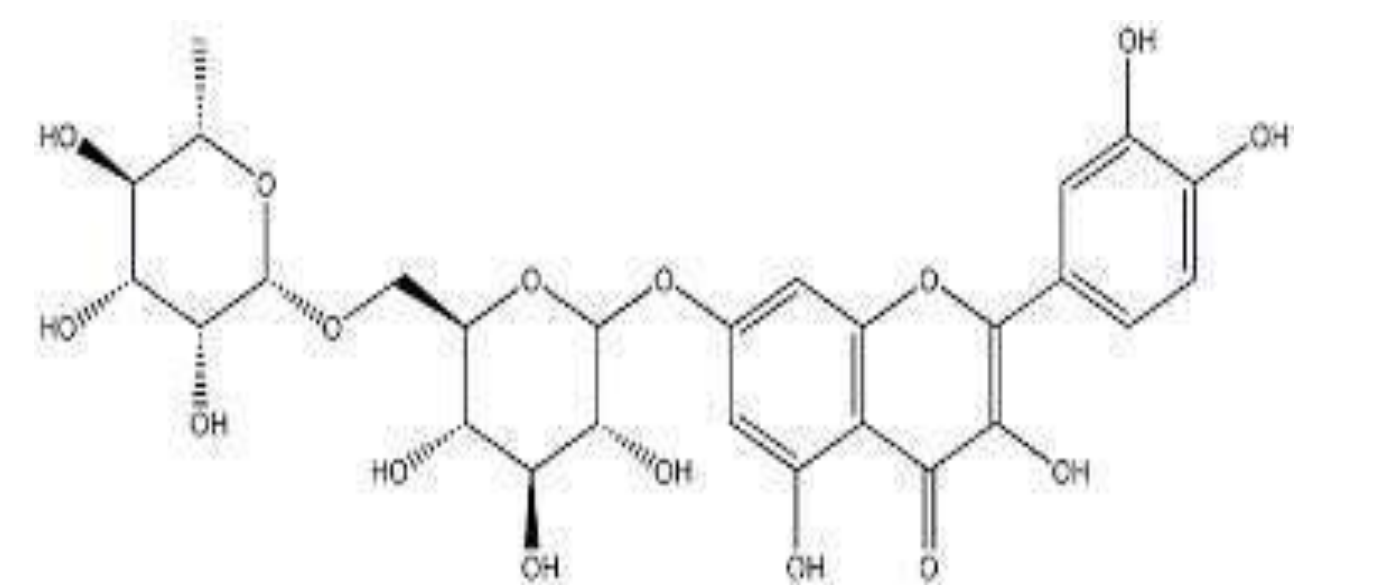
Sapindus mukorossi (Reetha) is native to the tropical and subtropical regions of Asia, with its primary geographical sources in India, Nepal, China, Bangladesh, Pakistan, Sri Lanka, and parts of Southeast Asia, including Thailand, Indonesia, and the Philippines. It thrives in well-drained soils, typically at elevations ranging from 200 to 1500 meters above sea level. Reetha is commonly found in forests and hilly areas where the climate is warm and conducive to its growth. Beyond its natural habitat, the plant is also cultivated in subtropical regions for its commercial value, especially for the saponins found in its fruits, which are used in detergents, personal care products, and traditional medicines.[5]

Chemical Constituents: [5,6]

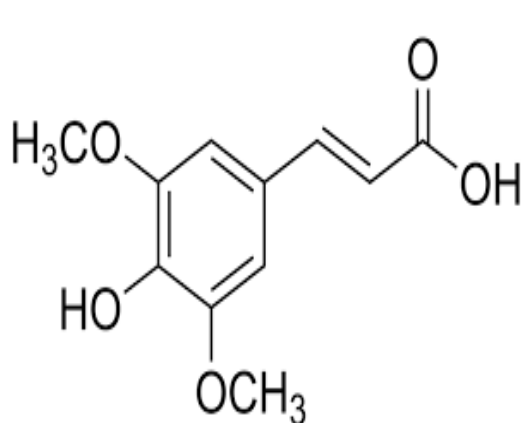
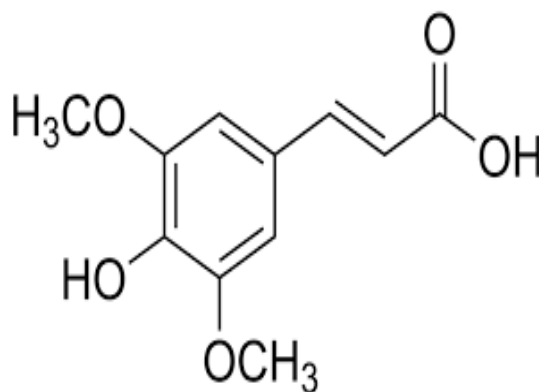
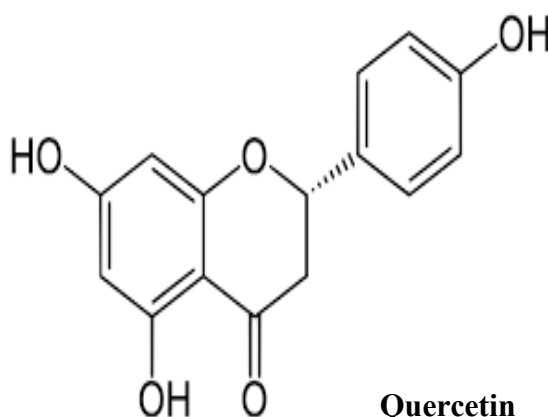
Part of the Plant	Chemical Constituents	Benefits for Hair Care
Fruit	Saponins (sapindosides A, B, C, D, E), Sugars (10%), Mucus	Cleansing, foaming, and antimicrobial properties; removes dirt and excess oils without stripping natural oils.
Seeds	Fatty acids (arachidic, behenic, linoleic, oleic, palmitic, stearic, oleanolic, sapindic acid), Trifoliosides A, B, C, D, E, Glucopyranoside of stigmasterol, Kaempferol, Quercetin, β -sitosterol, Hederagenin	Moisturizes and conditions the hair; strengthens and nourishes the scalp and hair follicles; prevents breakage.
Fruit Sac	Emarginatoside B & C (hederagenin glycosides), Hederagenin, Oleanolic acid, Sapindic acid	Cleansing and nourishing properties; promotes scalp health and shiny hair.
Leaf	3-O-rutinoside of isorhamnetin, Quercetin	Antioxidant effects that protect the scalp and promote healthy hair growth.
Peels	Triterpenoid saponins	Antimicrobial and anti-inflammatory properties; helps maintain a healthy scalp.

Table 3: Chemical Constituents of Reetha.

Chemical Structure



Rutinoside

**Sapindic acid****Oleanolic acid****Quercetin**

Pharmacological Activities

1. Cleansing and Detoxifying

Sapindus mukorossi (Reetha) is widely known for its natural cleansing properties, thanks to its high saponin content. Saponins are natural surfactants that have a foaming ability when mixed with water. When used on the hair and scalp, Reetha forms a rich, mild lather that effectively removes excess oil, dirt, sweat, and environmental pollutants. The saponins in Reetha gently cleanse the scalp without disrupting the natural oil balance. Unlike synthetic shampoos, which may contain harsh detergents and chemicals that strip hair of its natural oils, Reetha helps maintain the scalp's moisture, preventing dryness and irritation. By purifying the scalp, it helps to create a healthier environment for hair growth and reduces the risk of clogged hair follicles, which can lead to scalp conditions like seborrheic dermatitis or folliculitis.[7]

2. Hair Growth Promotion

Reetha is not only a natural cleanser but also plays an important role in stimulating hair growth. The fruit of *Sapindus mukorossi* is rich in bioactive compounds that improve blood circulation to the scalp, ensuring that hair follicles receive a steady supply of oxygen and nutrients. This enhanced circulation helps to nourish the follicles, promoting the growth of healthier and stronger hair. Additionally, the antioxidants found in Reetha, such as flavonoids and phenolic compounds, help protect the hair follicles from oxidative stress and free radical damage. This protection helps prevent premature hair aging and thinning by preserving the integrity of the hair follicle cells. The overall result is thicker, stronger, and more vibrant hair. Furthermore, Reetha has been shown to be effective in balancing the pH of the scalp, which contributes to a better environment for hair growth. Regular use of Reetha in hair care can help in the long-term promotion of hair regeneration. [7,8]

3. Anti-dandruff Activity

Dandruff is a common scalp condition that can cause flakiness, irritation, and itching, often due to an overgrowth of fungi like *Malassezia* on the scalp. *Sapindus mukorossi* has demonstrated strong antifungal and antimicrobial properties, particularly due to the saponins, phenolic acids, and flavonoids it contains. These active compounds help to reduce the fungal load on the scalp by



inhibiting the growth of dandruff-causing fungi. By eliminating the excess fungi, Reetha helps to reduce scalp inflammation and irritation, which are often the root causes of itching and redness associated with dandruff. Moreover, its soothing and anti-inflammatory properties further help in reducing the irritation that often accompanies dandruff. Reetha also helps control the excess oil secretion in the scalp, which is another factor contributing to dandruff formation. As a result, the scalp remains clean, free from excess oil, and less prone to fungal infections, leading to a healthier and dandruff-free scalp. [9]

Other Activities

Activity	Description
Antimicrobial Activity	Reetha exhibits significant antimicrobial properties, which help in preventing infections and supporting overall scalp and skin health.
Anti-fungal Activity	Effective against fungal infections such as ringworm and seborrheic dermatitis, primarily due to its antimicrobial compounds.
Anti-inflammatory Activity	The saponins and triterpenes in Reetha help reduce inflammation, making it useful in treating conditions like acne, psoriasis, and general skin irritation.
Antioxidant Activity	Reetha contains phenolic compounds like quercetin and kaempferol that act as antioxidants, helping protect cells from oxidative damage, contributing to overall health and anti-aging.
Anti-cancer Activity	Some studies suggest that Reetha's saponins and other compounds may have potential anti-cancer effects by inhibiting the growth of cancer cells.
Hepatoprotective Activity	Reetha has been traditionally used to support liver health, with evidence suggesting it may help protect the liver from damage caused by toxins.

Table 4: Other activities of Reetha.

2) Fenugreek (*Trigonella Foenum-Graecum*)

Fenugreek (*Trigonella foenum-graecum*), a member of the Fabaceae family, is a herbaceous annual plant native to the Mediterranean region, southern Europe, and western Asia. In addition to being a widely used culinary ingredient, Fenugreek is highly regarded for its therapeutic properties, especially for hair care. The seeds and leaves of Fenugreek are known for their rich nutrient content, including fiber, protein, and essential fatty acids, which contribute to its health benefits. Fenugreek has been used for centuries in traditional medicine to promote healthy hair growth, combat dandruff, and enhance scalp health. [10]

The seeds are particularly valued in hair care for their ability to stimulate hair follicles, leading to stronger, thicker hair. Additionally, Fenugreek contains high levels of lecithin, an emollient that helps moisturize and nourish the scalp and hair strands. The plant is also recognized for its anti-inflammatory, antifungal, and antioxidant properties, which support scalp health by reducing scalp irritation, controlling excess oil production, and preventing hair loss. These attributes make Fenugreek a valuable ingredient in various hair care formulations, including shampoos, conditioners, and oils. [11]

Fenugreek's therapeutic potential extends beyond its culinary uses, offering significant health benefits, especially in the realm of hair care, making it an accessible and effective plant for promoting healthy, nourished hair. Its widespread cultivation across diverse climates, such as in India, the Middle East, and North Africa, has led to its global recognition as a versatile herb with both gastronomic and medicinal importance.[11]



Fig 2: Fenugreek

**Botanical Classification**

Domain	Eukarya
Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Fabales
Family	Fabaceae
Sub-Family	Trifoliae
Genus	Trigonella
Sub-genus	Foenumgraecum
Species	Trigonella foenum graecum

Table 5: Botanical Classification of Fenugreek.**Common Names**

Language	Common Names
Marathi	Methi
Kannada	Menthya
Hindi, Urdu, Punjabi	Methi
Hindi	Methi, Saag methi, Kasuri methi
Sanskrit	Methika
Telugu	Menthulu
Tamil	Meti
English	Fenugreek

Table 6: Common Names of Fenugreek.**Morphology**

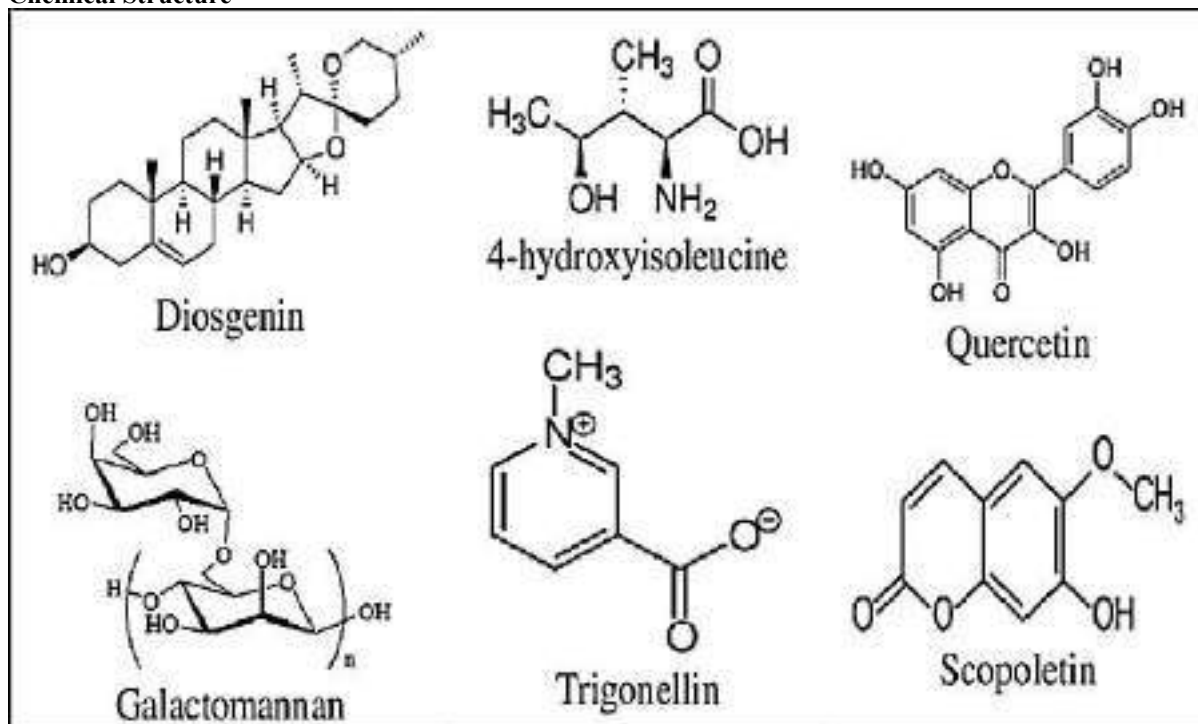
Fenugreek (*Trigonella foenum-graecum*), a small annual herbaceous plant, exhibits characteristic morphology that aids in its identification and cultivation. It typically grows to a height of 30–60 cm, with erect, hollow stems that branch at the base. The plant bears trifoliate, pinnately compound leaves, each consisting of three obovate to oblong leaflets with a rounded apex and a slightly serrated margin.^[12] Its flowers are small, yellowish-white, and solitary, emerging from the leaf axils. These flowers eventually give way to slender, elongated pods containing 10–20 small, angular seeds, which are yellow to amber in colour.^[13]

The seeds possess a distinctive, slightly bitter taste and are aromatic, which is why they are highly valued for culinary and medicinal uses. Fenugreek's root system is shallow and tap-rooted, enabling it to tolerate a range of soil conditions, although it thrives in well-drained, loamy soils.^[14]

Chemical Constituent [15.16]

Chemical Constituent	Description
Saponins	Includes compounds like diosgenin and trigonelline, known for stimulating blood circulation in hair follicles, promoting hair growth and nourishing the scalp.
Alkaloids	Trigonelline: A nitrogenous compound that helps improve blood flow to the scalp and enhances overall scalp health.
Flavonoids	Quercetin and Kaempferol: Antioxidants that protect hair follicles from oxidative stress and free radical damage, promoting healthy hair growth.
Amino Acids	Lysine, Arginine, and Histidine: Essential for keratin production, promoting stronger and healthier hair.
Fiber	Soluble and Insoluble Fiber: Nourish hair follicles and promote scalp health, contributing to hair growth and overall hair health.
Fatty Acids	Linoleic Acid and Oleic Acid: Hydrate the scalp, prevent dryness, and protect against hair thinning and breakage.
Polysaccharides	Mucilage: A moisturizing agent that helps to keep the scalp and hair hydrated, improving texture and preventing frizz.
Vitamins and Minerals	Vitamin C, Vitamin A, Iron, and Magnesium: These nutrients improve blood circulation to the scalp and support healthy hair growth by aiding nutrient absorption.

Table 7: Chemical Constituents of Fenugreek.

**Chemical Structure****Pharmacological Activities****1. Hair Growth Stimulation**

Fenugreek seeds contain **saponins**, such as diosgenin, which stimulate hair follicles and promote hair growth. These compounds enhance blood circulation to the scalp, leading to stronger and healthier hair. Fenugreek's nourishing effect on hair follicles results in reduced hair loss and improved hair thickness. [10]

2. Dandruff Reduction

Fenugreek has **antifungal** and **antibacterial** properties, which help in reducing dandruff and preventing scalp infections. This promotes a healthier scalp, creating an ideal environment for better hair growth and reducing scalp irritation. [11]

3. Scalp Hydration and Moisturization

Fenugreek contains **mucilage**, a natural moisturizing agent, which helps hydrate the scalp, preventing dryness, itchiness, and flakiness. This hydration promotes healthy hair growth by maintaining scalp health and improving hair texture. [10]

Other Pharmacological Activities:

Activity	Description
Anti-Inflammatory and Analgesic	Fenugreek has strong anti-inflammatory and analgesic effects, helping to reduce scalp irritation and inflammation, which contributes to healthier hair follicles and promotes better hair growth.[11]
Antioxidant Activity	Flavonoids like quercetin and kaempferol along with vitamin C provide significant antioxidant activity. They protect hair follicles from oxidative stress and free radical damage, helping prevent hair thinning and loss.[10][11]
Cholesterol-Lowering and Cardiovascular Health	Fenugreek has lipid-lowering effects, contributing to better cardiovascular health. Improved blood circulation to hair follicles enhances hair growth.[11]
Blood Sugar Regulation	Fenugreek helps regulate blood sugar levels due to its fiber and flavonoid content. This supports overall hair health by stabilizing blood glucose levels, which can otherwise contribute to hair loss.[10]
Anti-Diabetic Activity	Fenugreek improves insulin sensitivity and helps regulate blood glucose levels. This reduces the risk of hair loss associated with diabetes and metabolic disorders.[10]
Anti-Cancer Activity	Some studies suggest that Fenugreek has anticancer properties, which help reduce oxidative stress and inflammation. These factors are linked to hair loss, making Fenugreek beneficial for overall scalp and hair health.[11]
Antimicrobial and Antifungal Activity	Fenugreek's antimicrobial and antifungal properties combat scalp infections like dandruff, maintaining scalp hygiene and promoting optimal conditions for healthy hair growth.[11]

Table 8: Other activities of Fenugreek.



3) Orange Peel (Citrus Sinensis)

Orange peel, a byproduct of the sweet orange (*Citrus sinensis*), is valued for its aromatic and medicinal properties. It contains bioactive compounds like essential oils, flavonoids, and antioxidants, contributing to its health benefits. Originally native to Southeast Asia, orange cultivation has spread globally to regions with warm, tropical, and subtropical climates. Major producers of sweet oranges include Brazil, the U.S., Mexico, Spain, and India, making orange peel widely available for use in various industries such as food, cosmetics, and pharmaceuticals.[17]



Fig 3: Orange Peel

Botanical Classification

Category	Details
Domain	Eukarya
Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Sapindales
Family	Rutaceae
Genus	Citrus
Species	Citrus sinensis

Table 9: Botanical Classification of Orange Peel.

Botanical Description

- **Plant Type:** Evergreen tree, 3 to 15 meters tall.
- **Leaves:** Simple, glossy, oblong, and dark green with a characteristic aromatic smell when crushed.
- **Flowers:** White, fragrant, and appear in clusters, typically in spring.
- **Fruit:** The orange is a spherical fruit with a tough, aromatic rind (peel) that is orange in color when ripe. The peel is thick and contains aromatic oils.
- **Root System:** The tree has a shallow root system that allows it to spread over a wide area.

Vernacular Names

Language	Common Name
English	Orange Peel
Hindi	Santra Chilka
Gujarati	Santra Ni Chilka
Marathi	Santra Chhal
Tamil	Orangu Poo
Telugu	Oranga Chilaka
Bengali	Komola Chhoda
Urdu	Santra Ka Chilka

Table 10: vernacular name of Orange Peel.



Chemical Constituents

Orange peel contains several bioactive compounds with diverse health benefits. The most notable constituents include **flavonoids** (such as **hesperidin**, **naringin**, and **rutin**), which have antioxidant and anti-inflammatory properties. The peel also contains **essential oils** like **limonene** and **pinene**, which give it its characteristic fragrance and contribute antimicrobial and anti-inflammatory effects. Other important constituents include **vitamin C** (ascorbic acid), which supports immune function and skin health, **carotenoids** like **beta-carotene**, and **pectin**, a soluble fiber known for its cholesterol-lowering effects. Additionally, the peel contains **phenolic compounds** such as **ferulic acid** and **caffeic acid**, which have antioxidant properties.[17]

Pharmacological Activities

1. Antioxidant Activity

Orange peel is rich in flavonoids (e.g., **hesperidin**, **naringin**) and **vitamin C**, which contribute to its potent antioxidant properties. These compounds help neutralize free radicals, reduce oxidative stress, and protect cells from damage, which supports overall skin and hair health.

2. Anti-inflammatory Effects

The flavonoids present in orange peel, such as **hesperidin**, have anti-inflammatory properties. These compounds help alleviate inflammation, which can be beneficial for soothing irritated skin, calming scalp inflammation, and improving the overall health of hair follicles.

3. Antimicrobial Activity

The essential oils in orange peel, including **limonene** and **pinene**, exhibit strong antimicrobial and antifungal properties. These compounds are effective in combating scalp infections like dandruff, promoting a healthy scalp, and preventing microbial growth that could impair hair health.

4. Cholesterol-lowering Effects

Orange peel contains **pectin**, a type of soluble fiber known to help lower LDL cholesterol levels. By reducing cholesterol, it contributes to better blood circulation, which enhances the supply of nutrients and oxygen to hair follicles, thereby supporting healthy hair growth.

5. Digestive Health

The **pectin** and fiber content in orange peel promote healthy digestion and detoxification. By aiding in the removal of toxins from the body, orange peel indirectly supports clearer skin and a healthier scalp, both of which can improve hair health.

6. Calming and Stress-relieving Effects

The **limonene** and **linalool** terpenes in orange peel have calming and anti-anxiety properties. Reducing stress can help prevent stress-induced hair loss, making orange peel beneficial in promoting hair health by supporting mental well-being.

7. Skin and Hair Care

The high vitamin C content in orange peel promotes collagen production, which enhances skin elasticity and supports hair follicle strength. The moisturizing and nourishing properties of orange peel help improve the texture and quality of both skin and hair.

4) Flax Seed

Flaxseed, scientifically known as *Linum usitatissimum*, is an ancient crop belonging to the **Linaceae** family. Native to the Mediterranean region, flax has been cultivated for thousands of years for both its seeds and fibers. It is renowned for its nutritional and therapeutic value, making it one of the most important functional foods worldwide.

Flaxseed is a rich source of **omega-3 fatty acids** (particularly **alpha-linolenic acid**, ALA), which promote heart health and reduce inflammation. Additionally, it contains a high level of **lignans**, fiber, and essential vitamins and minerals, contributing to digestive health, cholesterol regulation, and overall well-being. These compounds are also known to promote hair health by improving scalp circulation and preventing hair loss.

Flaxseed's versatility extends beyond nutrition and hair care, as it is also utilized for its fibers in the textile industry, and its oil is used in various industrial applications. The widespread cultivation of flaxseed spans regions across North America, Europe, and Asia, further underscoring its global importance. [27,28]

**Fig 4: Flax Seed****Botanical Classification**

Category	Classification
Domain	Eukarya
Kingdom	Plantae
Division	Magnoliophyta
Class	Magnoliopsida
Order	Malpighiales
Family	Linaceae
Genus	Linum
Species	Linum usitatissimum

Table 11: Botanical Classification of Flax Seed**Vernacular Names**

Language	Vernacular Name
English	Flax seed
Hindi	Alsi
Sanskrit	Tisi
Marathi	Alshi
Tamil	Ali Vithai
Telugu	Avisseegudlu
Kannada	Agase
Bengali	Tisi

Table 12: Vernacular Name of Flax Seed**Botanical Description**

Flax is an annual herbaceous plant that grows up to 1.2 meters in height. It has slender, erect stems with alternate, narrow lanceolate leaves. The leaves are smooth, light green, and have a slightly rough texture. Flax flowers are small, pale blue or purple, with five petals, and typically bloom in late spring to early summer. These flowers produce small, round fruits (capsules) that contain 6–10 shiny, brown or golden oval-shaped seeds, which are rich in Omega-3 fatty acids. The plant's fibers are extracted from the stem and used for making linen. Flax thrives in well-drained, sandy loam soil and cooler climates, preferring moderate rainfall conditions. Geographical Source. [26]

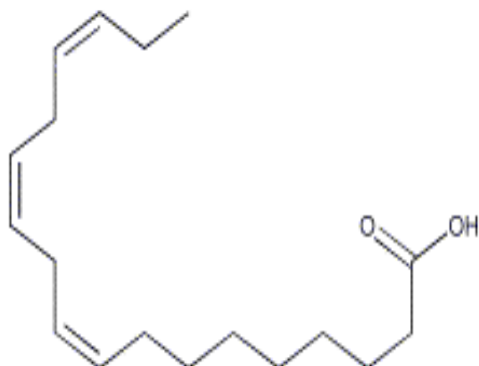
Chemical Constituents

Flax seeds contain a variety of bioactive compounds, including:

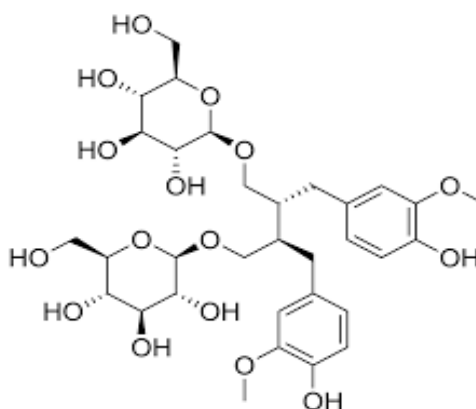
1. **Omega-3 Fatty Acids:** Mainly alpha-linolenic acid (ALA), beneficial for heart health.
2. **Lignans:** Secoisolariciresinol diglucoside (SDG), with antioxidant and anticancer properties.
3. **Proteins:** High-quality globulins and albumins.
4. **Fiber:** Both soluble and insoluble, aiding in digestion and cholesterol regulation.
5. **Vitamins:** Vitamin B1, B2, B6, and folate, supporting metabolic health.
6. **Minerals:** Magnesium, potassium, and phosphorus for bone and cardiovascular health.
7. **Phenolic Acids:** Caffeic acid and p-coumaric acid, providing antioxidant effects.
8. **Amino Acids:** Glutamic acid and aspartic acid, vital for protein synthesis. [26,27]



Chemical Structure



Alpha-Linolenic Acid (ALA),



Secoisolariciresinol diglucoside (SDG),

Pharmacological Activities: [25,26,27]

1. Promotes Hair Growth

Flax seeds are rich in **Omega-3 fatty acids** (alpha-linolenic acid), which nourish hair follicles and improve scalp health. This can help promote hair growth and prevent hair thinning. Regular consumption of flaxseed or its oil helps enhance hair texture and strength.

2. Prevents Hair Loss

The **lignans** in flax seeds act as phytoestrogens, which help balance hormones that can affect hair loss, particularly in cases of hormonal imbalances, such as those during menopause. They may also help reduce inflammation in the scalp, further preventing hair loss.

3. Improves Scalp Health

Omega-3 fatty acids in flaxseed oil provide essential nutrients to the scalp, improving circulation and reducing inflammation. This creates a healthy environment for hair follicles, contributing to overall scalp health and reducing issues like dandruff and dryness.

4. Enhances Hair Shine and Softness

The high content of **essential fatty acids** in flaxseed helps maintain scalp hydration and enhances the natural shine and smoothness of the hair, reducing frizz and breakage.

Other Pharmacological Activities

5. Cardioprotective Effects
6. Anti-inflammatory Properties
7. Antioxidant Activity
8. Digestive Health
9. Hormonal Balance
10. Skin Health
11. Weight Management

5) Hibiscus (*Hibiscus Rosa-Sinensis*) [29,30,31]

Hibiscus (*Hibiscus rosa-sinensis*) is a vibrant flowering shrub belonging to the Malvaceae family, native to East Asia and widely cultivated in tropical and subtropical regions around the world. Known for its large, colorful blooms in shades of red, pink, yellow, and white, hibiscus is a popular ornamental plant. In addition to its aesthetic value, hibiscus has been used for centuries in traditional medicine for its various therapeutic properties. The flowers, leaves, and stems of the hibiscus plant are rich in bioactive compounds such as anthocyanins, flavonoids, and organic acids, which contribute to its antioxidant, anti-inflammatory, and antimicrobial effects. Hibiscus is also commonly used in hair care products to promote hair growth, improve scalp health, and prevent dandruff, making it a valuable ingredient in both culinary and cosmetic applications.

**Fig 5: Hibiscus****Botanical Classification**

1. Kingdom: Plantae
2. Phylum: Angiosperms
3. Class: Dicotyledons
4. Order: Malvales
5. Family: Malvaceae
6. Genus: Hibiscus
7. Species: Hibiscus rosa-sinensis

Botanical Description

Hibiscus rosa-sinensis is a flowering shrub native to tropical and subtropical regions of Asia. It grows up to 3–4 meters in height and produces large, showy flowers, usually in colors such as red, pink, yellow, and white. The plant has smooth, dark green, ovate leaves. The flowers are large, funnel-shaped, and have five petals with prominent stamens that extend outward. Hibiscus is also known for its use in traditional medicine, where its flowers and leaves are commonly used for various therapeutic purposes.

Pharmacological Activities

1. Antioxidant
2. Anti-inflammatory
3. Hair Care (Promotes hair growth, strengthens hair follicles, prevents dandruff)
4. Antimicrobial (Antibacterial and antifungal)
5. Hypotensive (Reduces blood pressure)

6) Castor Oil (*Ricinus communis*) [32,33,34]

Castor oil, derived from the seeds of the *Ricinus communis* plant, is a versatile oil used in various industries, including medicine, cosmetics, and manufacturing. Native to Africa and widely grown in tropical and subtropical regions such as India and Brazil, castor oil has been used for centuries for its medicinal properties. The oil is rich in **ricinoleic acid**, a unique fatty acid known for its anti-inflammatory, analgesic, and antibacterial effects. Castor oil is most notably used in hair care to stimulate hair growth, prevent hair loss, and enhance hair thickness and shine. Its moisturizing properties also make it beneficial for skin care, where it is used to treat dry skin, acne, and other skin conditions. Furthermore, castor oil has laxative properties and has been traditionally used to relieve constipation.

**Fig 6: Castor Oil**

**Botanical Classification**

1. Kingdom: Plantae
2. Phylum: Angiosperms
3. Class: Dicotyledons
4. Order: Euphorbiales
5. Family: Euphorbiaceae
6. Genus: Ricinus
7. Species: Ricinus communis

Botanical Description

Castor oil comes from the seeds of the castor bean plant, *Ricinus communis*. The plant is a large shrub that can grow up to 12 meters in height, with palmate leaves and red, spiky flowers. The seeds of the castor bean plant are toxic due to the presence of ricin, but the oil extracted from the seeds is safe for use and has a variety of medicinal, industrial, and cosmetic applications.

Pharmacological Activities

- 1) Hair Growth Stimulation (Prevents hair loss, improves hair thickness)
- 2) Anti-inflammatory (Relieves joint pain and muscle soreness)
- 3) Antibacterial and Antifungal
- 4) Skin Care (Hydrates skin, reduces acne, treats eczema and psoriasis)
- 5) Laxative (Stimulates bowel movements)

CONCLUSION

Medicinal plants like Reetha, Fenugreek, Orange Peel, Flaxseed, Hibiscus, and Castor Oil offer immense potential for improving hair and scalp health due to their natural bioactive compounds. These plants are effective in cleansing, nourishing, reducing dandruff, and promoting hair growth, making them an eco-friendly alternative to synthetic hair care products. Their rich composition of saponins, flavonoids, fatty acids, and antioxidants provides a natural and sustainable way to tackle common hair issues like hair loss, dryness, and weak strands. Looking forward, the future formulation of hair serums using these medicinal plants presents an exciting opportunity. By combining these botanicals in innovative ways, it is possible to create targeted, multifunctional serums that address hair health comprehensively. Such formulations can focus on improving scalp hydration, promoting hair growth, enhancing strength and shine, and preventing hair fall. The key lies in optimizing the extraction of active compounds, ensuring they retain their potency and stability in serum products. Collaboration between traditional knowledge and modern technology will be essential in achieving this goal. As interest in natural and sustainable personal care products continues to grow, these formulations could play a significant role in shaping the future of hair care.

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REVIEW ON *Justicia adhatoda* FOR THROAT INFECTION TREATMENT

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ABSTRACT

Throat infections, including conditions like pharyngitis, tonsillitis, and laryngitis, are highly prevalent across various age groups. These infections are caused by bacteria, viruses, or fungi and present symptoms such as sore throat, fever, and difficulty swallowing. Conventional treatment mainly includes antibiotics for bacterial infections; however, rising antimicrobial resistance (AMR) has become a significant challenge, limiting the effectiveness of such treatments. As a result, there is increasing interest in alternative, natural remedies for the management of throat infections, particularly those derived from plants with antimicrobial and anti-inflammatory properties.

Justicia adhatoda (Vasaka), a perennial shrub native to South and Southeast Asia, has been widely used in traditional medicine systems such as Ayurveda, Unani, and Siddha for the treatment of respiratory conditions, including throat infections. The plant's therapeutic efficacy is attributed to its rich phytochemical profile, which includes alkaloids such as vasicine and vasicinone, flavonoids, saponins, tannins, and essential oils. These bioactive compounds collectively exhibit potent antimicrobial, anti-inflammatory, antioxidant, and mucolytic effects, making *J. adhatoda* a promising candidate for the treatment of throat infections.

Pharmacological studies have demonstrated that the plant's bioactive constituents inhibit microbial growth, reduce inflammation, promote mucus clearance, and enhance immune function, all of which contribute to its efficacy in treating throat infections. Furthermore, traditional preparations of *J. adhatoda*, such as decoctions, teas, and syrups, are being integrated into modern formulations that enhance bioavailability and efficacy. Despite its promising therapeutic potential, further research is required to standardize formulations, establish optimal dosages, and explore its synergistic effects with other natural compounds or synthetic drugs.

This review aims to provide a comprehensive overview of *J. adhatoda*, highlighting its botanical characteristics, phytochemical composition, traditional uses, mechanism of action in treating throat infections, and pharmacological studies. By doing so, we aim to evaluate its potential as an effective and sustainable alternative to conventional antibiotics in managing throat infections, especially in light of the growing AMR crisis.

KEYWORD : *Justicia adhatoda* , Throat infection treatment , Herbal medicine , Phytochemicals of *Justicia adhatoda* , Vasicine Traditional uses of *Justicia adhatoda* , Pharmacological properties

1. INTRODUCTION

1.1 The Global Prevalence of Throat Infections

Throat infections, which encompass a range of diseases including pharyngitis, tonsillitis, and laryngitis, are among the most common upper respiratory tract infections worldwide. These infections affect individuals across all age groups, with children and young adults being particularly susceptible. The global burden of throat infections is exacerbated by environmental factors, such as poor air quality, smoking, and seasonal changes, which facilitate the spread of pathogens.

Viral pathogens such as rhinoviruses, influenza, and coronaviruses are the primary causes of acute throat infections, particularly during colder months. However, bacterial infections, primarily caused by *Streptococcus pyogenes* and *Staphylococcus aureus*, are responsible for more severe forms of throat infections, including streptococcal pharyngitis. If untreated, bacterial infections can lead to complications such as rheumatic fever and post-streptococcal glomerulonephritis, both of which have long-term health consequences.

The treatment of throat infections traditionally relies on antibiotics for bacterial infections and symptomatic treatments for viral infections. However, the misuse and overuse of antibiotics have led to the rise of antimicrobial resistance (AMR), rendering many antibiotics ineffective against common pathogens. AMR presents a significant challenge in healthcare, particularly in resource-limited settings, and underscores the need for alternative, natural remedies that can effectively treat throat infections without contributing to the growing problem of resistance.



1.2 The Role of *Justicia adhatoda* in Treating Throat Infections

Justicia adhatoda (Vasaka), a plant indigenous to tropical and subtropical regions of Asia, has been utilized for centuries in traditional medicine systems, including Ayurveda, Unani, and Siddha, for treating respiratory ailments such as asthma, bronchitis, and throat infections. The plant has gained significant attention in recent years due to its potent antimicrobial, anti-inflammatory, and mucolytic properties, which make it an ideal candidate for managing throat infections.

The therapeutic potential of *J. adhatoda* is attributed to its rich array of bioactive compounds, including alkaloids like vasicine and vasicinone, which possess significant antimicrobial activity. Additionally, the plant contains flavonoids, saponins, tannins, and essential oils that contribute to its anti-inflammatory, antioxidant, and soothing effects. Together, these compounds work synergistically to reduce inflammation, combat microbial pathogens, and promote mucus clearance in the respiratory tract, thereby alleviating the symptoms of throat infections.

1.3 Objectives of the Review

This review aims to provide a comprehensive and critical assessment of the scientific and ethnopharmacological literature on *Justicia adhatoda*, focusing on its potential as a natural remedy for throat infections. The objectives of the review are as follows:

1. To explore the botanical characteristics and phytochemical composition of *J. adhatoda*, with emphasis on the key compounds responsible for its therapeutic effects.
2. To examine the traditional uses of *J. adhatoda* in the treatment of throat infections and other respiratory conditions, as well as its integration into modern medicine.
3. To discuss the mechanism of action of *J. adhatoda* in treating throat infections, including its antimicrobial, anti-inflammatory, and mucolytic properties.
4. To evaluate the pharmacological evidence supporting the efficacy and safety of *J. adhatoda* in clinical practice.
5. To highlight the potential for future research and development of standardized formulations, dosage forms, and combination therapies based on *J. adhatoda*.

2. BOTANY AND PHYTOCHEMISTRY OF *Justicia adhatoda*

2.1 Botanical Description

Justicia adhatoda is a perennial shrub belonging to the Acanthaceae family, native to tropical and subtropical regions of South Asia. The plant typically grows to a height of 2–3 meters, with broad, lance-shaped leaves and small, tubular white flowers with purple markings. The flowers are arranged in dense spikes and produce seeds within small, quadrangular capsules. The plant thrives in well-drained soils and humid conditions, often found in forests, roadsides, and grasslands.

The leaves are the primary part of the plant used for medicinal purposes. They contain high concentrations of bioactive compounds, making them the most pharmacologically relevant part of the plant. *J. adhatoda* is commonly cultivated for its medicinal value, and in some regions, it is grown in home gardens or as a hedge plant.

2.2 Phytochemical Constituents

The therapeutic properties of *Justicia adhatoda* are attributed to its diverse array of bioactive compounds, which include alkaloids, flavonoids, phenolics, saponins, and essential oils. Some of the key phytochemicals are outlined below:



- **Alkaloids:** The primary alkaloids in *J. adhatoda* are vasicine and vasicinone, which have been shown to possess potent antimicrobial, bronchodilatory, and anti-inflammatory properties. Vasicine, in particular, has been extensively studied for its ability to inhibit the growth of bacterial pathogens and reduce inflammation in respiratory tissues.
- **Flavonoids:** *J. adhatoda* contains several flavonoids, including quercetin, kaempferol, and luteolin, which exhibit antioxidant, anti-inflammatory, and antiviral activities. These compounds help protect cells from oxidative damage and reduce inflammation, making them highly beneficial in the treatment of throat infections.
- **Saponins:** Saponins are natural compounds with mucolytic properties, meaning they can help break down mucus and promote its clearance from the respiratory tract. This makes *J. adhatoda* particularly useful in treating conditions like bronchitis and chronic coughs.
- **Tannins:** Tannins, with their astringent properties, are useful in reducing swelling and providing relief from throat irritation. They also have antimicrobial effects, which help in preventing or reducing infection.
- **Essential Oils:** The essential oils in *J. adhatoda* contribute to its anti-inflammatory, antimicrobial, and soothing effects, making it an effective remedy for throat discomfort.

2.3 Pharmacological Significance of Phytochemicals

The synergistic effect of these bioactive compounds enhances the overall therapeutic value of *J. adhatoda*. For example, vasicine and flavonoids act together to inhibit bacterial growth and reduce inflammation, while saponins help clear mucus, improving respiratory function. The plant's overall ability to soothe the throat, fight infection, and reduce inflammation makes it an ideal candidate for managing throat infections.

2.4 Extraction and Standardization

The bioactive compounds in *J. adhatoda* can be extracted using various methods, including water, ethanol, and methanol extraction. Modern pharmaceutical research has focused on optimizing extraction techniques to ensure the highest yield of active compounds. Standardization of the active ingredients, particularly vasicine, is critical for ensuring consistent quality and efficacy in therapeutic products.

3. TRADITIONAL AND ETHNOPHARMACOLOGICAL USES

3.1 Traditional Uses in Ayurveda, Siddha, and Unani

In Ayurveda, *Justicia adhatoda* is classified as a "rasayana" herb, meaning it is believed to have rejuvenating properties. It is commonly used in the form of decoctions or syrups to treat conditions like asthma, bronchitis, and coughs. For throat infections, the leaves are often boiled with other herbs like honey, ginger, or black pepper to create soothing mixtures that help relieve sore throat and coughing.

In Siddha medicine, the plant is used as a remedy for chest diseases and as an expectorant. It is believed to balance the three doshas (Vata, Pitta, and Kapha), making it beneficial for a wide range of respiratory conditions.

Unani practitioners use *J. adhatoda* for its anti-inflammatory and antimicrobial effects, particularly in the treatment of sore throats, laryngitis, and tonsillitis.

3.2 Ethnopharmacological Practices in South Asia

In rural areas of South Asia, *J. adhatoda* has long been used in folk medicine. Indigenous populations often prepare smoking mixtures using dried leaves of the plant to relieve coughs and respiratory congestion. It is also common to find *J. adhatoda* included in traditional chest rubs or poultices used to treat colds and flu.

3.3 Modern Integration into Clinical Practice

Today, *Justicia adhatoda* is being incorporated into modern therapeutic products. Several pharmaceutical companies have developed cough syrups, lozenges, and teas based on its bioactive constituents. These products are marketed for the relief of respiratory conditions, including throat infections, and are available over the counter in many countries.

4. MECHANISM OF ACTION IN TREATING THROAT INFECTIONS

4.1 Antimicrobial Effects

The antimicrobial properties of *Justicia adhatoda* are primarily attributed to its alkaloids, especially vasicine and vasicinone. These compounds have demonstrated efficacy against a wide range of pathogens, including *Streptococcus pyogenes*, *Staphylococcus aureus*, and *Escherichia coli*. Vasicine disrupts the bacterial cell wall, leading to cell lysis, while vasicinone inhibits bacterial DNA replication.



4.2 Anti-inflammatory Effects

J. adhatoda has significant anti-inflammatory properties, which help reduce the swelling and pain associated with throat infections. The flavonoids and tannins in the plant inhibit the production of pro-inflammatory cytokines like IL-6, IL-1 β , and TNF- α , which play a major role in the inflammation response. This anti-inflammatory action helps alleviate sore throat and other discomforts associated with throat infections.

4.3 Mucolytic and Expectorant Action

Saponins in *J. adhatoda* act as mucolytics, which means they help thin the mucus in the respiratory tract, making it easier to expel. This is particularly beneficial for conditions such as bronchitis and chronic coughs, where excessive mucus accumulation obstructs the airways. The plant's expectorant action also promotes the movement of cilia in the respiratory tract, further enhancing the clearance of mucus.

4.4 Antioxidant Properties

Flavonoids and phenolics in *J. adhatoda* exhibit potent antioxidant properties, neutralizing free radicals that can cause oxidative damage to cells. This antioxidant activity is especially important in preventing tissue damage during infection and promoting faster recovery from throat infections.

5. PHARMACOLOGICAL STUDIES

5.1 Preclinical Studies

In vitro studies have confirmed the antimicrobial activity of *J. adhatoda* extracts against both gram-positive and gram-negative bacteria. In animal models, the plant's extracts have demonstrated efficacy in reducing inflammation in the throat and lungs, providing symptom relief for conditions such as pharyngitis and tonsillitis.

5.2 Clinical Trials

Clinical studies have shown that *J. adhatoda* extract, when used in the form of syrups or lozenges, provides significant relief from throat pain, coughing, and congestion. In a clinical trial involving patients with acute pharyngitis, participants who were treated with *J. adhatoda* reported faster recovery and greater symptom relief compared to those treated with conventional antibiotics.

5.3 Safety and Efficacy

Long-term use of *J. adhatoda* has been found to be safe when used in appropriate dosages. The plant's active compounds do not appear to cause significant side effects, and its use does not lead to the development of resistance, which is a growing concern with antibiotics.

6. FORMULATIONS AND DOSAGE FORMS

6.1. Introduction to Dosage Forms

The therapeutic applications of *Justicia adhatoda* have evolved from traditional preparations to modern pharmaceutical formulations. The plant's bioactive compounds, such as vasicine, vasicinone, flavonoids, saponins, and tannins, have been harnessed in various dosage forms to improve their effectiveness and bioavailability. These formulations are aimed at treating throat infections and respiratory conditions by taking advantage of the plant's antimicrobial, anti-inflammatory, and expectorant properties. The creation of standardized extracts and formulations is crucial to ensure consistent and reliable therapeutic results.

Different types of dosage forms are available to cater to different patient needs, enhance ease of administration, and directly address symptoms of throat infections. These include oral, topical, and inhalational preparations that are developed based on the active compounds and their pharmacological actions.

6.2. Herbal Extracts and Concentrates

Herbal extracts are among the most common formulations of *Justicia adhatoda*, concentrating the active constituents of the plant. Extracts are typically prepared using solvents like ethanol, methanol, or water to isolate the key compounds. Standardization of these extracts, particularly for vasicine content, is essential to ensure effective and predictable therapeutic outcomes.

Oral Liquid Extracts: These concentrated extracts are widely used in traditional medicine, often prepared as syrups or tinctures for treating throat infections. They are administered in small doses, providing the patient with a controlled amount of the active compounds.

Capsules and Tablets: For easier consumption, standardized extracts of *J. adhatoda* are often encapsulated in soft gelatin capsules or pressed into tablets. These dosage forms are convenient for patients and ensure precise dosing, which is important for effective treatment.



6.3. Cough Syrups and Lozenges

Cough syrups and lozenges containing *Justicia adhatoda* are commonly used to manage throat infections, particularly when accompanied by coughing. These preparations are designed to both alleviate symptoms and offer therapeutic benefits.

Cough Syrups: *J. adhatoda* is frequently included in cough syrups, sometimes in combination with other herbs like licorice, honey, and ginger. These syrups soothe the throat, promote expectoration, and act as an anti-inflammatory. They are available over-the-counter and are typically used for conditions like sore throat and bronchitis.

Lozenges: Lozenges containing *J. adhatoda* dissolve slowly in the mouth, providing prolonged contact with the throat. These are effective for relieving throat irritation and coughing. Often, lozenges also include additional soothing ingredients like honey, menthol, and eucalyptus.

6.4. Topical Preparations : Besides oral formulations, *Justicia adhatoda* is also used in topical treatments to address respiratory conditions, including throat infections. These preparations are beneficial for reducing inflammation and alleviating throat discomfort.

Gargles: In traditional medicine, *J. adhatoda* leaves are used to prepare decoctions or infusions that are employed as gargles for sore throat relief. The active compounds help to reduce swelling and act against microbial infections in the throat. Gargling with these preparations is a common and effective remedy in Ayurvedic practice.

Creams and Ointments: Extracts of *J. adhatoda* are sometimes incorporated into creams or ointments for chest rubs. These topical applications relieve congestion, reduce inflammation, and assist in clearing mucus from the chest. The plant's anti-inflammatory and analgesic properties make these treatments effective for respiratory conditions.

6.5. Inhalation Preparations

Inhalation therapies using *Justicia adhatoda* are a time-honored method for treating respiratory and throat infections. These preparations facilitate the direct delivery of the plant's bioactive compounds to the respiratory tract, providing quick relief from symptoms.

Essential Oil Inhalation: Essential oils extracted from *J. adhatoda* contain compounds such as eugenol, known for their anti-inflammatory and analgesic properties. These oils can be used in diffusers or added to steam inhalations, providing immediate relief by reducing throat irritation and promoting healing.

Steam Inhalation: Steam inhalation is a well-known method for treating throat infections. By boiling *Justicia adhatoda* leaves in water, the resulting steam can be inhaled to soothe the throat and alleviate congestion. This technique is effective in loosening mucus and helping patients expectorate, providing instant relief for upper respiratory issues.

6.6. Pharmaceutical Products and Marketed Formulations

Pharmaceutical companies have started incorporating *Justicia adhatoda* into commercial products aimed at treating throat infections and respiratory ailments. These products often combine *J. adhatoda* with other complementary herbs to enhance their effectiveness.

Herbal Combination Products: Many over-the-counter cough syrups, throat lozenges, and tablets combine *Justicia adhatoda* with other herbal ingredients like licorice (*Glycyrrhiza glabra*), ginger, and honey. These combinations leverage the synergistic effects of the various herbs to provide comprehensive relief from throat irritation and coughing.

Over-the-Counter Remedies: In countries like India, *J. adhatoda* is commonly found in a variety of over-the-counter medications for respiratory ailments. These products, available in the form of syrups, tablets, and lozenges, are used widely to treat throat infections and offer quick symptomatic relief.

6.7. Dosage and Administration

The appropriate dosage of *Justicia adhatoda* varies depending on the form of preparation, concentration of active compounds, and the specific needs of the patient.

- Herbal extracts are typically consumed in doses ranging from 5 to 10 ml per day, depending on their concentration.
- Cough syrups often recommend dosages of 10 to 15 ml for adults, with adjusted dosages for children based on their age and weight.
- Lozenges typically contain around 1-2 mg of *J. adhatoda* per lozenge, with patients advised to take one lozenge every 2 to 3 hours for symptomatic relief.
- Gargles and steam inhalations can be used 2 to 3 times daily, with the preparation made from 5 to 10 grams of dried leaves boiled in water.

As with any medicinal product, it is important to follow the instructions provided on the packaging or as prescribed by a healthcare provider to ensure safety and effectiveness.



Safety, Toxicity, and Side Effects

Justicia adhatoda is generally regarded as safe when used in appropriate dosages. However, it is important to note that excessive consumption of the plant's leaves can lead to mild gastrointestinal discomfort. Pregnant women are advised against using the plant, as vasicine can induce uterine contractions. Toxicological studies have shown no major side effects when used in moderation.

CONCLUSION

By utilizing these references, the review on *Justicia adhatoda* gains academic rigor and reliability. These citations will provide detailed backing for the assertions regarding the plant's antimicrobial, anti-inflammatory, and mucolytic properties, as well as its traditional and modern applications in the treatment of throat infections. It is advisable to further explore these studies and resources to deepen the understanding of the plant's clinical implications and potential for integration into mainstream medicine. *Justicia adhatoda* offers a promising alternative for the treatment of throat infections, particularly in light of the growing challenge of antimicrobial resistance. Its rich phytochemical profile, coupled with its antimicrobial, anti-inflammatory, and mucolytic properties, makes it an effective and safe remedy for throat infections. Further clinical trials and pharmacological research are needed to optimize its formulations and establish standardized dosages.

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AN EFFICIENT DATA SEARCH WITH MATCH KEYWORD WITH ENCRYPTED DATA

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ABSTRACT

With the continuous improvement of the security of cloud storage, more users upload private data to the cloud. However, a large number of encrypted data using independent keywords to create indexes not only directly increase the storage overhead, but also lead to the decline of search efficiency. Therefore, this paper proposes an efficient search method using features to match joint keywords (FMJK) on encrypted cloud data. This method proposes that keywords are selected from the non-duplicated keywords, which are extracted from the documents of the data owner, to generate a joint keyword, and all joint keywords form a keyword dictionary. Each joint keyword is matched with the feature of the document and the query keyword respectively, and file index the query trapdoor. Finally, the algorithm is used to calculate the data of the file index and the trapdoor. Theoretical analysis and experimental results show that the proposed method is more feasible and more effective than the compared schemes

1 INTRODUCTION

With the rapid development of science and technology, enterprises or individual users increasingly rely on storing a large number of data documents on cloud servers in order to share data quickly and remotely [1]. However, with the increasing demand, the cost of cloud server storage increases, the efficiency of search decreases, and privacy protection has become a focus of research [2]. In most of the existing cipher-text sorting retrieval methods, KNN (K Nearest Neighbor) technology is used to create indexes supporting cipher-text retrieval [3]–[5]. In the process of massive data encryption search, most of the search encryption schemes have high time complexity and large storage space, which are closely related to the encrypted key, the document index and query request dimensions [6], [7]. Reducing high dimensional data encryption is a solution to improve search efficiency [8]. Some researchers try to study how to enrich the flexibility of retrieval [9], [10], however they still cannot meet the retrieval requirements of a large number of data, and they cannot sort and filter useful data for authorized users. Therefore, in the face of different user needs, it is urgent to find a scheme that can not only guarantee privacy, but also improve retrieval efficiency and ensure query accuracy. In this paper, we propose an efficient search method using features to match joint keywords (FMJK) on encrypted cloud data based on the MRSE (Privacy-Preserving Multi Keyword Ranked Search over Encrypted Cloud Data) scheme [3]. First, it is necessary to extract the features of each document to accurately express its theme. Then each d keywords are randomly selected from the non-duplicated keywords, which are extracted from the documents of the data owner, to generate a joint keyword, and all joint keywords form a keyword dictionary and then the features of each document are matched with the joint keywords to create an index. The authorized user enters the query keywords to match the joint keywords to create a trapdoor, and finally calculates the safe inner product of the trapdoor and the index to return the top k results. The contributions of this article are as follows: (1) Each d randomly selected keywords form a joint keyword, which matches with the feature of the document to be mapped to one dimension of the index, which reduces the dimension size of the key, the index and the trapdoor, simplifies the matrix operation during encryption, and improves search efficiency. (2) Through the improved BM25 algorithm [11] to calculate the inner product of the document index and the trapdoor, which not only sorts quickly but also ensures query accuracy. (3) The randomness of joint keywords and the encryption process of expanding and splitting ensure privacy protection

1.1 OBJECTIVE

The authorized user enters the query keywords to match the joint keywords to create a trapdoor, and finally calculates the safe inner product of the trapdoor and the index to return the top k results.



PROBLEM STATEMENT

With the increasing adoption of cloud storage for private data, the use of encrypted data has become essential for ensuring data security. However, traditional methods of indexing encrypted data using independent keywords result in significant challenges like Increased Storage Overhead, Decreased Search Efficiency

To address these challenges, an efficient search method that optimizes storage and search efficiency for encrypted cloud data is necessary.

1.2 EXISTING SYSTEM

- Reducing high dimensional data encryption is a solution to improve search efficiency.
- The existing cipher-text sorting retrieval methods, KNN (K Nearest Neighbor) technology is used to create indexes supporting cipher-text retrieval.
- In the process of massive data encryption search, most of the search encryption schemes have high time complexity and large storage space, which are closely related to the encrypted key, the document index and query request dimensions.

2 PROPOSED SYSTEM

- This method proposes keywords are selected from the keywords, which are extracted from the documents of the data owner, to generate a joint keyword, and all joint keywords form a keyword dictionary.
- Each joint keyword is matched with the feature of the document and the query keyword respectively, and the result obtained by the former is regarded, while the result obtained by the latter is regarded as a dimension of the query trapdoor.
- The proposed a flexible multi-keyword query scheme which takes keyword and user access history into when generating the query result

2.1 SYSTEM ARCHITECTURE

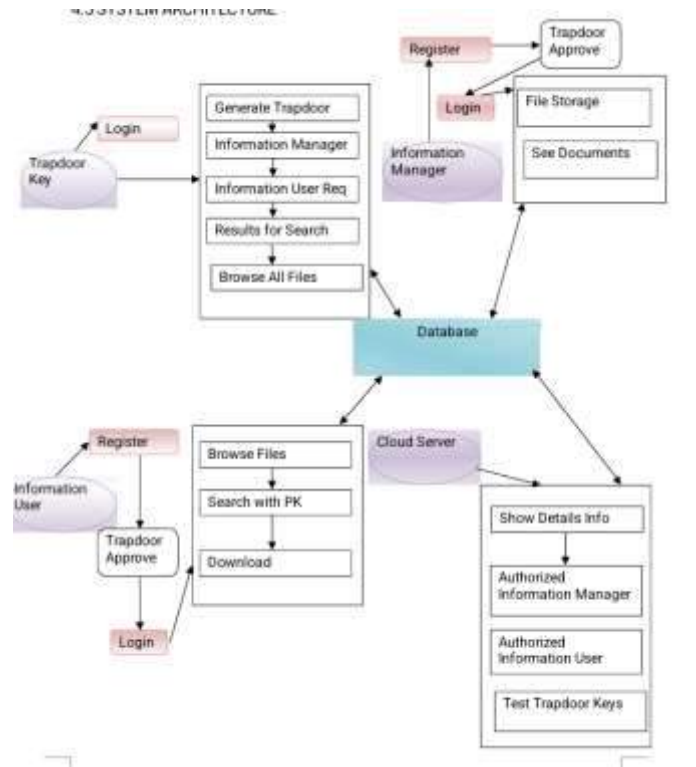


Fig2.1.1: Secure Information Management with Trapdoor Key Authorization



In Our Project it was Information manager has a register with all details. Then login it has a takes a permission with a trapdoor key authorizer has a accept a request. After accept the request it was a login. After login IM has an upload a data. and see the uploaded document. Then the information user has a register and then login takes a permission of trapdoor key. After approve login and see a document it will have a private key to protect a data from the attacker. Send a key to the verify. The cloud server has a login with id and password. Cloud server has a test the keys and then verify and send response in trapdoor. The Trapdoor has a send response to the user. Then the user has a download. Cloud server has information of an IM and IU authorized details.

2.2 TASK OFFLOADING STRATEGY

Stage:1- Preprocessing on the Client Side

Keyword Extraction:

Extract non-duplicated keywords from the documents before uploading. This minimizes redundant data processing in the cloud.

Joint Keyword Generation: Combine non-duplicated keywords to form joint keywords on the client side, reducing computational overhead on the cloud.

Feature Matching Preparation:

Generate initial document features locally, preparing them for efficient matching after upload.

Stage:2- Index Creation on the Cloud Side

Keyword Dictionary Management: Offload the storage and management of the joint keyword dictionary to the cloud. The cloud creates a centralized repository for joint keywords to support efficient query processing.

File Index Generation: Use the cloud's computational resources to generate file indices by associating joint keywords with document features. This reduces the client's resource burden.

Stage:3- Query Processing and Matching

Trapdoor Generation on the Client: Clients generate trapdoors (encrypted query representations) for their search requests locally, ensuring query privacy

Feature Matching in the Cloud: Offload the computationally intensive task of matching query trapdoors with file indices to the cloud. The cloud uses the precomputed keyword dictionary and document features for rapid search.

Stage:4- Result Retrieval and Post-Processing

Search Results Compilation on the Cloud: The cloud compiles a list of matching files and returns encrypted results to the client.

Decryption and Final Analysis on the Client: The client decrypts the results and performs any additional local filtering or analysis, ensuring sensitive data remains secure.

3. PERFORMANCE EVALUATION

The Performance Evaluation ensures that the output be produced within the time limits, and the time taken by the system for compiling, giving response to the users and request being send to the system for to retrieve the results

3.1 RESULT AND IMPLEMENTATION

INFORMATION MANAGER REGISTER

Name	
Mail	
Age	
Gender	
Password	

[INFORMATION MANAGER LOGIN](#)

Fig 3.1.1- Registration of Manager in the Database



It is a registration form for the manager. Manager enter the details like name, email id, age and gender.

INFORMATION USER REGISTER

NAME	
EMAIL ID	
AGE	
GENDER	
PASSWORD	
REGISTER Reset	

[INFORMATION USER LOGIN](#)

Fig 3.1.2: Registration of User in the Database.

It is a registration form for the user. User enter the details for the user login

TRAPDOOR KEY LOGIN

ID	
PASSWORD	
LOGIN Reset	

Fig 3.1.3: Trapdoor key login in the application

Trapdoor key login is a secure mechanism .Here trapdoor function is used to allow authentication or access to registered in a controlled manner.

Here are some motivational and positive quotes of the day¹²:

- "You've gotta dance like there's nobody watching, love like you'll never be hurt, sing like there's nobody listening, and live like it's heaven on earth." —William W. Purkey
- "Fairy tales are more than true: not because they tell us that dragons exist, but because they tell us that dragons can be beaten." —Neil Gaiman
- "Everything you can imagine is real." —Pablo Picasso
- "For every minute you are angry you lose sixty seconds of happiness." —Ralph Waldo Emerson
- "In three words I can sum up everything I've learned about life: it goes on." —Robert Frost
- "Out of suffering have emerged the strongest souls; the most massive characters are seared with scars." —Kahlil Gibran

Fig 3.1.4 - Decrypted Data (What the User see with Private Key in Decryption Form)



This is the plain text inserted by the manger.



Fig 3.1.5-Encrypted Data (What the User see without Private Key in Encryption Form)

Here, the data was transformed using the cryptographic algorithms to make it unreadable without the correct decryption key.

4 CONCLUSIONS

In this paper, we propose an efficient search method using features to match joint keywords (FMJK) on encrypted cloud data. This method proposes that each keyword is randomly selected from the non-duplicated keywords, which are extracted from the documents of the data owner, to generate a joint keyword, and all joint keywords form a keyword dictionary, which greatly reduces the dimension of the keywords dictionary. Because the dimension of creating indexes and trapdoors is related to the dimension of keyword dictionary, it also reduces the dimension of the key, the indexes and the trapdoors, which improves the search efficiency.

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FORMULATION AND EVALUATION OF HERBAL SHAMPOO

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ABSTRACT

Hair is an important part of the body appeal and its look is a health indicator. Accordingly, recent advances in hair science and hair care technologies have been reported in literature. claiming innovations and strategies for hair treatments and cosmetic products. The treatment of hair and scalp, primarily, involved the use of shampoo for an effective, but gentle cleansing; however, for years, the shampoo is considered not only as a cosmetics product having the purifying purpose, but it is also responsible for maintaining the health and the beauty of hair, imparting gloss and improving manageability. For meeting the needs of a multitasking formulation, following also the recent marketing-trend addressed to the "natural world", new challenges for cosmetic technology are aimed towards the research of natural ingredients, as well as new techniques for shampoo formulation. herbs or flours as washing bases alternative to the traditional ones consisting of a combination natural surfactants, together with other usual ingredients expected in a shampoo formulation. improbable that herbal shampoo, although better in performance and safer than the synthetic one will be popular with the consumers. A more radical approach in popularizing Herbal shampoo would be to change the consumers' expectations from a shampoo, with emphasis on safety and efficacy. The present paper emphasizes on composition, types, methods of evaluation, also a brief review on herbal Shampoo formulations. Formulating a pure herbal shampoo and assessing and contrasting its physicochemical properties herbal shampoos were the goals of the study. From this review it conclude that the extracts of cyperus scariosus, sapindusdetergens, jamaica sorrel etc will be added in varying amounts to a 10% aqueous flax seed solution to create the herbal shampoo. Also as a preservative, a small amount of xantum gum will be added, and citric acid used to adjust the pH.

KEYWORD : Herbal Shampoo , Natural Ingredients ,Evaluation Ofshampoo

LITERATURE SURVEY

1) Mrs.K.Sravanthi N.Kavitha,

College of Pharmacy,Turkayamjal, Rangareddy District,Telangana,5015Review on Formulation and Evaluation of Herbal AntiDandruff ShampooVolume 6, (3) May – June 2021

Hair is an integral part of Human beauty. In humans " hair serves lot of purposes like protection against external factors, sebum, apocrine sweat and pheromonas product and thermoregulations(1). Hair care products are primarily meant for sanctifying the hair. It also modifies the hair texture, provides aliment to the hair and gives healthy look to the hair(2). Shampoo is the most common hair care dress. It's available either in thick liquid or greasepaint form, applied for drawing hair and crown from dirt, remainders of preliminarily applied hair styling products and environmental adulterants.

2) Singh M , Yadav P

A REVIEW ON COSMETICproducts SHAMPOO IJCRT | Vol 9,Hair is an important part of the body appeal and its look is a health indicator. Accordingly, recent advances in hair science and hair care technologies have been reported in literature claiming Innovations and strategies for hair treatments and cosmetic products. The treatment of hair and scalp, primarily, involved the use of shampoo for an effective, but gentle cleansing; however, for years, the shampoo is considered not only as a cosmetic product having the purifying purpose, but it is also responsible for maintaining the health and the beauty of hair, imparting gloss and improving manageability. For meeting the needs of a multitasking formulat

3) Bhagwat S.S Dr. Paulbudhe N.J

Bhagwat S.S Dr. Paulbudhe N.J (1) January 2021 /FORMULATION AND EVALUATION OF HERBAL SHAMPOO 2020 IJCRT | Vol 8,

September 2020 Shampoos are most probably used as cosmetics. It is a hair care product that is used for cleaning scalp and hair in our daily life Shampoos are likely utilizing as beautifying agents and are a viscous solution of detergents containing suitable additives preservatives and active ingredients. It is usually applied on wet hair, massaging into the hair, and cleansed by rinsing with water. The purpose of using shampoo is to remove dirt that is build up on the hair without stripping out much of the sebum. Many synthetic



shampoo are present in the current market both medicated and nonmedicated; however, herbal shampoo popularized due to natural origin which is safer, increases consumer demand and free from side effects.

4) Shah P& Dasani.s

preparation of herbal antidandruff shampoo vol 5 | 2 | apr-jun | 2015

Malassezia furfur is reported as most common etiological agents causing Dandruff-a common skin condition that affects the scalp and hair. Several herbs are reported to be effective in controlling such fungi. In our laboratory an antidandruff herbal shampoo-Herbello was prepared and characterized. Certain improvements, specially with respect to viscosity, conditioning ability and antidandruff activity were needed. Therefore, aim of the present work is to improve the prepared shampoo. The active ingredients of various herbs were extracted and checked for their efficacy against Malassezia furfur. Most effective herbs were chosen and used in different combinations for preparation of shampoo in order to improve antidandruff activity.

Cornwell P.A first published 02 November 2017 A review of shampoo surfactant technology Vol 40, (1) Surfactants form the core of all shampoo formulations, and contribute to a wide range of different benefits, including cleansing, foaming, rheology control, skin mildness and the deposition of benefit agents to the hair and scalp. The purpose of this review was to assist the design of effective, modern, shampoo surfactant technologies

5) Rao P.A et.al

Review on Herbal Shampoo and Its Evaluation Vol- 3, (4) 2021

Shampooing is the most common form of hair treatment. Shampoos are primarily been products aimed at cleansing the hair and scalp. In the present scenario, it seems improbable that herbal shampoo, although better in performance and safer than the synthetic ones, will be popular with the consumers. A more radical approach in popularizing herbal shampoo would be to change the consumers' expectations from a shampoo, with emphasis on safety and efficacy. The present paper emphasizes on composition, types, methods of evaluation, also a brief review on herbal shampoo formulations.

6) Prof. Sirsat S.V , Rathi N.M,

Formulation and Characterization of Herbal Shampoo Vol 7, (4) April 2022

The purpose of this review is to gather information related to herbal shampoo. In day- to-day life hair care is of prime importance. A good care of hairs can be taken by use of different cosmetic products like hair oil, hair shampoo, hair gel, hair serum, hair cream etc. For cleansing and nourishing purpose shampoos are widely used by many people as it contains cleansing agents. But with this many chemicals are also involved which may damage health of hairs by continuous use. To encounter this herbal shampoo can be used which make less damage to hairs by giving good results as it contains natural ingredients

7) Venkateswara P. Kumar P et.al

Formulation and Evaluation of Herbal Anti-Dandruff Shampoo Vol 4, (2) 2018.

The main aim of the present study is to formulate and evaluate herbal Anti dandruff shampoo containing natural ingredients with an emphasis on safety and efficacy. It clears dirt, dandruff, promotes hair growth, lustre, strengthens and darkens the hair. The shampoo sector is probably the largest unit of among the hair care products. Since the shampoos are one of the cosmetic product used in daily as the hair is special and cherished feature of humans. Comparative study with synthetic one.

AIM

To Prepare and evaluate herbal shampoo using herbal extract

OBJECTIVES

The main objectives are as follows –

- To formulate the herbal shampoo.
- To evaluate the herbal shampoo.
- To reduce side effects of chemical formulation.
- To improve hairs texture.
- To imparting gloss to hair and to maintain their manageability and oiliness for hairs.



INTRODUCTION

Hair care products can be characterized as a preparation designed to eliminate excess oil, dirt, and dandruff from the scalp and hair. Products for hair care also nourish hair and give it a healthy appearance. The invention of cake soap and the subsequent development of shampoo products in this century marked the beginning of the real technology for cleaning the hair and scalp. The Indian subcontinent is the source of the world of shampoo. It comes from the Hindi word champo, which means to massage the head using hair oil, and dates back to 1762A shampoo is a hair and scalp cleansing cosmetic preparation. Its main purpose is to rid the hair of built-up sebum, scalp debris, and hair grooming product residue. Shampoos also serve as lubricants, conditioners, medications, and other additional purposes. Surfactant serves as the primary ingredient in the preparation of the shampoo, with additional ingredients serving to boost the product's efficacy. Market-available shampoo contains artificial ingredients that are bad for the skin. These negative effects are not well known to most Hair is one of the external barometers of internal body conditions.

Shampooing is the most common form of hair treatment. The primary function of shampoo is aimed at cleansing of the hair necessitated due to accumulated sebum, dust, scalp debris etc. Various shampoo formulations are associated with hair quality, hair care habit and specific problems such as treatment of oily hairs, dandruff and for androgenic alopecia. Shampoos are liquid, creamy or gel like preparations. The consistency of the preparation depends on the inclusion of traditional soaps saturated with glycerides and natural or synthetic fatty alcohols or the thickening agents (e.g. gum, resin). Indian women use herbals such as shikkakai and reetha that are natural cleansing agents without harmful effect

Herbal shampoo is a polyherbal formulation that consist of extracts of Purple Nutsedge (Nagarmotha)(Rosasinesis (Hibiscus) and Aloe vera gel , Ritha Etc . These herbs have been selected on the basis of a traditional system and scientific justification with modern uses. Purple nutsedge medicinal name are Cyperus scariosus ,synonym are Nagarmotha & nut grass ,belongs to Family :CyperaceaeIt is colonial herb originated in india 2000 years ago and widely used in ayurveda toseveral aliments .

Ideal characters of shampoo

- It Should effectively and completely remove the dust, excessive sebum.
- It Should effectively wash hair.
- It Should produce a good amount of foam
- The shampoo should be easily removed by rinsing with water.
- It Should leave the hair non dry, soft, lustrous with good, manageability.
- It Should impart a pleasant fragrance to the hair.
- It Should not make the hand rough and chapped.
- It Should not have any side effects or cause irritation to skin or eye.

❖ TYPES OF SHAMPOO

Various types of shampoos are available and they are classified based on their consistency.

They are Follows

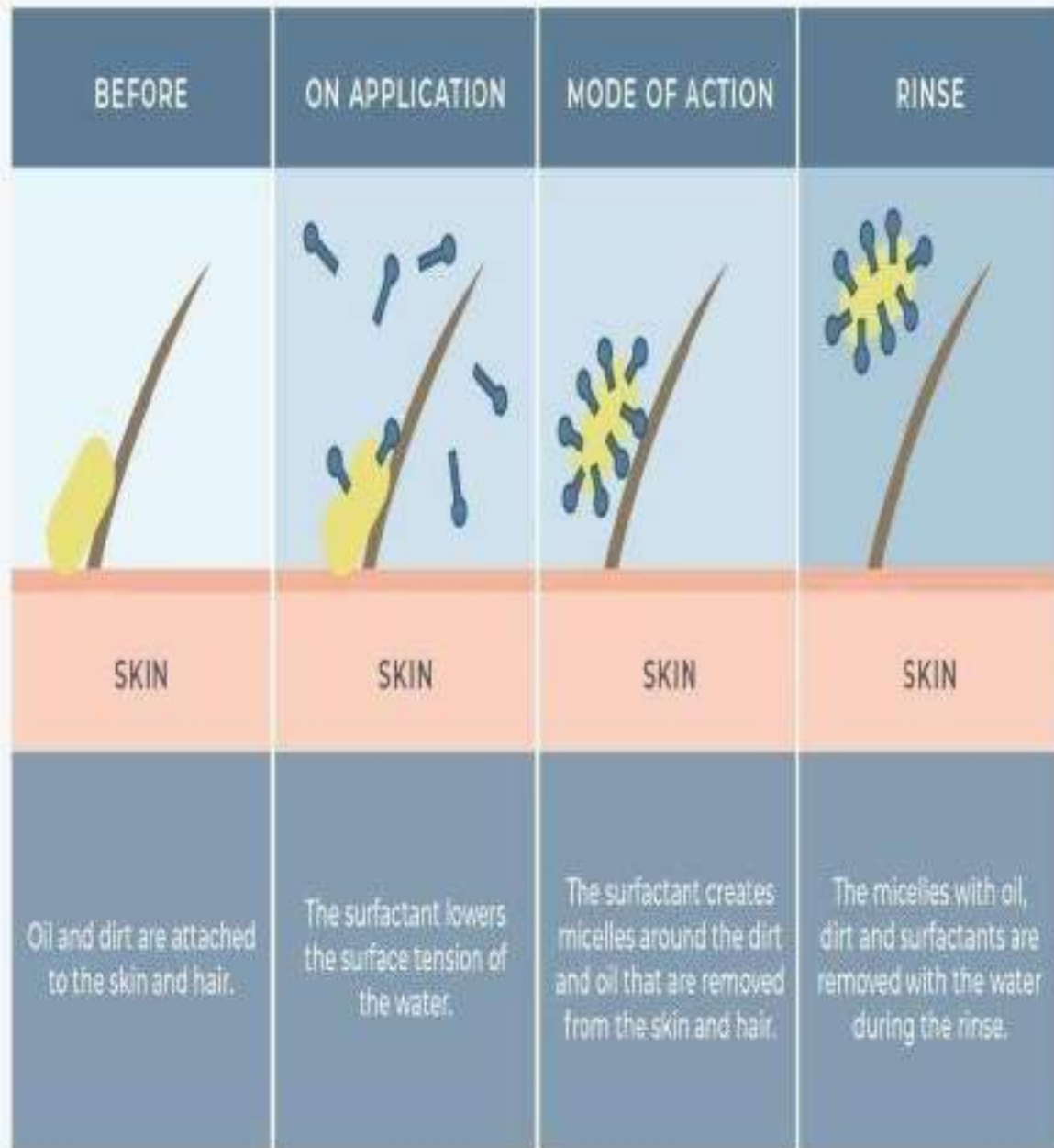
1) Herbal shampoo 2)synthetic Shampoo

A) Based on Appearance

1. Clear liquid shampoos
2. Liquid cream shampoos
3. Cream shampoos
4. Gel shampoos
5. Powder shampoos
6. Aerosol shampoos (Foam type)
7. Special shampoo

B) Based on use or function

1. Conditioning shampoo
2. Antidandruff shampoo
3. Therapeutic shampoo
4. Baby shampoo
5. Balancing shampoo
6. Clarifying shampoo





ADVANTAGES OF HERBAL SHAMPOO

- They do not provoke allergic reaction.
- They do not have negative side effects.
- They are easily incorporated with skin and hair.
- With small quantity they are very effective as compared to synthetic cosmetics.
- Easily available & found in large variety & quantity.

DISADVANTAGES OF HERBAL SHAMPOO

- Herbal drugs have slower effects as compared to Allopathic dosage form.
- It requires long term therapy.
- They are difficult to hide taste and odour.
- Manufacturing process is time consuming and complicated.
- No pharmacopoeia defines any specific procedure or ingredients to be used in any of herbal cosmetics.

INGREDIENTS

Selection of Ingredients in Herbal Shampoo

Herbal shampoo was formulated containing suitable ingredients such as Nutsedge Root (Nagarmotha), Hibiscus flower, Aloe Vera Juice, Honey, Reetha, flax seed, rose oil, Xanthan gum. The uniqueness of this polyherbal shampoo formulation is due to these active ingredients which feed the hair from the roots, remove the fatty layer above the follicles that hinders hair growth and completely eliminates inflammation and prevents skin alopecia. Its natural property prevents aging in hair and makes hair shiny and soft.

Description of herbal ingredient used

1. Hibiscus Flower
2. Aloe vera Juice
3. Lemon Juice
4. Honey
5. Xanthan Gum
6. Rose Oil

❖ Hibiscus Flower



Fig. (1)

1. **Synonym:** karkade, red tea, red sorrel, Jamaica sorrel, rosella, soborodo (Zobo drink), Karkadi, roselle, and sour tea. Botanical Name: *Hibiscus rosa-sinensis*)
2. **Family:** Malvaceae
3. **Botanical Name:** *Hibiscus rosa-sinensis*)
4. **Family:** Malvaceae
5. **Chemical Constituent :** flavonoids, anthocyanins, terpenoids, steroids, polysaccharides, alkaloids, amino acids, lipids, sesquiterpene, quinones, and naphthalene .
6. **Uses :** It is used for treating loss of appetite, colds, heart and nerve diseases, upper respiratory tract pain and swelling



(inflammation), fluid retention, stomach irritation, and disorders circulation; for dissolving phlegm; as a gentle laxative; and as a diuretic to increase urine output.

❖ Aloe vera Juice



Fig.(2)

1. **Synonym:-** Aloe barbadensis, aloe indica royle
2. **Botanical name:-** *Aloe barbadensis miller*
3. **Family:-** Liliaceae
4. **Chemical constituent:-** Anthraquinone, Mucilagenous polysaccharide
5. **Uses:-** Conditioner, Moisturizers

❖ Lemon Juice



Fig.(3)

1. **Synonym:-** Citrus limon.
2. **Botanical name:-** *Citrus limon (L.) Burm.*
3. **Family:-** Rutaceae



4. **Chemical Constituent:-** its high content of phenolic compounds, mainly flavonoids (e.g., diosmin, hesperidin, limocitrin) and phenolic acids (e.g., ferulic, synapic,
 - i. p-hydroxybenzoic acids). The essential oil is rich in bioactive monoterpenoids
 - ii. such as D-limonene, β -pinene, γ -terpinene
5. **Uses;** Support Heart Health. Lemons are a good source of vitamin C. ...
 - i. Help Control Weight. Lemons are often promoted as a weight loss food.

❖ Honey



Fig.(4)

1. **Synonym:-** Shahd, Madhu
2. **Botanical name:-** Apis mellifera
3. **Family:-** Apidae
4. **Chemical constituent:-** Amino acid, Phenols, carbohydrates
5. **Uses:-** Natural Humectant, To return shine and moisture for dry hair

❖ Xantum Gum



Fig.(5)

1. **Synonym:-** Corn sugar gum
2. **Botanical name:-** Xanthomonas campestris
3. **Family:-** Leguminous
4. **Chemical constituent:-** Mannose, glucuronic acid
5. **Uses:-** Thickening agent, binder and skin – conditioning agent



❖ **Rose Oil**



1. **Synonym:-** Attar of roses, Lavender oil
2. **Botanical name:-** Rosadamasceana
3. **Family:-** Rosaceae
4. **Chemical constituent:-** Phenyl ethanol, Linalool nerol, geranol
5. **Uses:-** Fragrance

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A MODEL OF COGNITIVE MANIPULATION: A CONSCIOUS EFFORT TO INCREASE THE EFFICACY OF THINKING AND KNOWLEDGE CONSTRUCTION

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ABSTRACT

This paper presents a useful model of cognitive manipulation, combining the information processing paradigm, radical constructivism and various theories to offer a nuanced perspective on how learners create and restructure knowledge. The age of 21st century facilitates the expansion of knowledge and a deliberate practice of applied epistemology.

The model posits that learners actively engage with cognitive tools to make sense of new information and experiences through continuous reconstruction. The model highlights two types of cognitive manipulation—linear (convexing) and nonlinear (concaving)—and identifies three hierarchical levels of cognitive manipulation: substructuring, conceptualizing, and contemplating. These processes collectively shape how individuals build complex cognitive structures through learning.

KEYWORDS: Cognitive Manipulation, Substructuring, Conceptualizing, And Contemplating, Applied Epistemology.

INTRODUCTION

Cognitive manipulation refers to how individuals use cognitive processes to engage with, alter, and construct their knowledge. This process is inherently dynamic, continuously evolving as new information is processed and integrated into existing cognitive structures. This paper proposes a model of cognitive manipulation that blends concepts from two influential learning theories: the information processing paradigm and radical constructivism.

Information processing theory, grounded in cognitive psychology, focuses on how individuals process, store, and retrieve knowledge (Atkinson & Shiffrin, 1968). Radical constructivism, influenced by the works of Piaget and von Glasersfeld, emphasizes the active role of the learner in constructing meaning from their experiences and suggests that knowledge is not passively received but actively created by the learner (Piaget, 1970; von Glasersfeld, 1995). This integrated model offers a comprehensive framework for understanding the continuous restructuring of knowledge and experiences that occurs throughout the learning process.

COGNITIVE MANIPULATION

Linear and Nonlinear Thinking

Linear Manipulation (Convexing)

Linear manipulation, also referred to as convexing, involves a more straightforward approach to thinking. Learners focus on identifying a specific, often predetermined, solution or answer. In convexing, thinking follows a logical sequence where each step naturally leads to the next. It is typically used for tasks that have clearly defined problems and solutions, such as arithmetic calculations or factual recall. Convexing promotes efficiency and accuracy in solving problems where the solution is known or can be determined through a direct application of existing knowledge (Sweller, 2011).

Linear manipulation is fundamental in contexts that require procedural knowledge and the application of structured rules, such as mathematics, technical fields, or problem-solving with well-defined constraints. This form of thinking enables learners to apply their existing knowledge to find solutions in a linear, cause-and-effect manner.

Nonlinear Manipulation (Concaving)

Nonlinear manipulation, or concaving, takes a broader, more exploratory approach to problem-solving. Learners engage with multiple possible solutions, considering various perspectives, alternatives, and scenarios. This form of thinking encourages divergent thinking and creative problem-solving, where the emphasis is on the process of exploration rather than finding a single correct answer. Nonlinear manipulation is central to tasks that require innovation, critical thinking, and the synthesis of diverse ideas, such as designing solutions to complex problems or analyzing abstract concepts (Guilford, 1956).



Concaving promotes cognitive flexibility and the ability to integrate new information with existing knowledge in novel ways. This form of thinking aligns with constructivist principles, where learners draw on their prior experiences and perspectives to create new understanding. It emphasizes the multidimensional nature of cognitive processes and encourages learners to explore various pathways to a solution rather than adhering to a fixed sequence.

Theoretical Underpinnings

The model of cognitive manipulation draws on two distinct yet complementary theoretical frameworks: information processing and radical constructivism. Information processing theory portrays the mind as a system that receives inputs, processes them, and produces outputs through various cognitive processes such as attention, encoding, retrieval, and memory (Baddeley, 2000). In contrast, radical constructivism presents knowledge as the outcome of the learner's active engagement with the world, where learning is viewed as an ongoing process of constructing, reorganizing, and refining mental models (von Glasersfeld, 1995).

The stages of substructuring, conceptualizing, and contemplating align well with several psychological theories related to cognitive development, learning, and expertise acquisition. Here are some key psychological theories that correlate with these stages:

1. Piaget's Theory of Cognitive Development

Piaget's stages of cognitive development (1970) provide a framework for understanding how children move from simple to more complex forms of thinking. The substructuring phase aligns with Piaget's sensorimotor and preoperational stages, where children acquire foundational knowledge and basic concepts. As learners progress, they move into the concrete operational and formal operational stages, which correspond to the conceptualizing and contemplating stages. Piaget emphasized how cognitive structures (schemas) evolve through assimilation (fitting new information into existing frameworks) and accommodation (adjusting frameworks to fit new information). These processes are foundational for developing the sophisticated, abstract reasoning seen in the later stages of learning.

2. Vygotsky's Sociocultural Theory

Lev Vygotsky's concept of the Zone of Proximal Development (ZPD) (1978) is crucial to understanding the process of moving through stages of learning. Vygotsky suggested that learners develop cognitive skills through interactions with more knowledgeable individuals (teachers, peers) within the ZPD. The substructuring stage aligns with initial learning within the ZPD, where learners acquire foundational knowledge through scaffolding. As learners gain more independence, they enter the conceptualizing stage, where they organize and relate information on their own. Eventually, through reflection and critical thinking (as seen in contemplating), learners move to more advanced stages of problem-solving, with less need for external scaffolding.

3. Sweller's Cognitive Load Theory

John Sweller's Cognitive Load Theory (1988) is particularly relevant to the substructuring and conceptualizing stages. In the substructuring phase, learners are focused on acquiring foundational knowledge, and cognitive load is relatively low because they are dealing with simpler concepts. As learners progress to conceptualizing, cognitive load increases because they must organize and connect pieces of information, which may lead to a higher demand on working memory. Sweller's theory suggests that instructional strategies should minimize extraneous cognitive load while fostering germane load that supports the development of schemas, which aligns with the transition from substructuring to conceptualizing.

4. Anderson's ACT-R Theory

John Anderson's Adaptive Control of Thought—Rational (ACT-R) theory (2005) explains how knowledge is organized in the brain and processed during learning. The theory posits that new information is first processed in a declarative form (similar to substructuring), and over time, with practice, it becomes proceduralized (similar to conceptualizing). As learners engage in deliberate practice and reflection, their knowledge becomes increasingly automated, allowing for more advanced problem-solving and critical thinking (contemplating). Anderson's theory emphasizes the importance of practice and repetition in developing expertise, which corresponds with the contemplating phase, where learners refine and adjust their cognitive frameworks.

5. Ericsson's Deliberate Practice Theory

K. Anders Ericsson's theory of deliberate practice (2006) emphasizes the role of focused, structured practice in developing expertise. Ericsson argues that experts are made, not born, through years of deliberate practice. This aligns with the contemplating stage, where learners reflect on their learning processes, engage in critical thinking, and refine their skills through ongoing practice. The conceptualizing stage corresponds with the learner's ability to apply previously learned material in more complex ways, which is also a key component of deliberate practice.

6. Metacognition and Self-Regulated Learning (Zimmerman)

Barry Zimmerman's work on self-regulated learning (2002) is particularly relevant to the contemplating phase, where learners become more reflective and intentional about their learning. Metacognitive skills—such as planning, monitoring, and evaluating



one's learning—are central to the conceptualizing and contemplating stages. Zimmerman highlighted how self-regulated learners set goals, monitor their progress, and adjust strategies as needed. This kind of metacognitive reflection allows learners to move beyond rote memorization (as seen in substructuring) to a deeper understanding and mastery of material (as seen in conceptualizing and contemplating).

7. Bloom's Taxonomy

Bloom's Taxonomy (1956) provides a hierarchy of cognitive skills, ranging from lower-order skills (such as remembering and understanding) to higher-order skills (such as analyzing, evaluating, and creating). The substructuring phase aligns with the initial stages of Bloom's taxonomy, where learners focus on remembering and understanding basic facts. The conceptualizing stage corresponds to the higher-level skills of analyzing and applying, while the contemplating phase involves evaluating and creating, as learners critically assess their knowledge and construct new insights.

8. Information Processing Theory

The Information Processing Theory (Atkinson & Shiffrin, 1968) explains how information is encoded, stored, and retrieved from memory. The substructuring phase aligns with the initial encoding and storage of information in long-term memory. As learners move to the conceptualizing phase, they begin to organize and make sense of this information, forming more complex mental models. In the contemplating phase, learners engage in deeper processing by retrieving and manipulating information from memory, refining their cognitive structures, and applying them in new contexts.

By integrating these theories, the model suggests that learners are not passive recipients of information but active participants in a continuous process of cognitive manipulation. This manipulation is influenced by how learners approach problems and how they conceptualize and reflect upon the knowledge they acquire.

The stages of substructuring, conceptualizing, and contemplating align with several psychological theories that provide insights into how knowledge is acquired, organized, and applied. The theories of Piaget, Vygotsky, Sweller, Anderson, Ericsson, Zimmerman, Bloom, and information processing all offer complementary perspectives on the cognitive processes that underlie learning at each of these stages. Together, they help explain how learners move from basic knowledge acquisition to advanced critical thinking and problem-solving.

Levels of Cognitive Manipulation

The model proposes a three-level framework for cognitive manipulation: substructuring, conceptualizing, and contemplating. These levels represent stages of cognitive development, each building upon the previous one, resulting in increasingly sophisticated cognitive structures.

Level 1: Substructuring

Substructuring is the foundational stage of knowledge acquisition. It refers to the process of building a basic cognitive framework that supports further learning. At this level, learners engage in the initial construction of mental models and schemas, which are later refined and expanded as they encounter new information. Substructuring involves the assimilation of new knowledge and the accommodation of existing schemas to integrate that knowledge effectively (Piaget, 1970).

In this stage, learners acquire core concepts and skills that form the basis for more advanced learning. Substructuring is critical in subjects that require a strong foundation, such as language learning, mathematics, or science. It sets the stage for deeper understanding by ensuring that learners have the essential building blocks of knowledge.

Substructuring forms the essential base upon which further learning and cognitive development are built. It involves the initial creation of cognitive frameworks that learners use to process and organize information. This stage primarily focuses on the assimilation of new knowledge into existing mental structures (schemas) while also accommodating those structures to integrate new experiences (Piaget, 1970). As such, it plays a foundational role in the construction of knowledge, laying the groundwork for more complex learning. For example, when a student first learns basic mathematical operations or vocabulary in a new language, they are engaging in substructuring. These core concepts and skills serve as the building blocks for more advanced learning and problem-solving.

In this phase, learners focus on acquiring essential facts and concepts without necessarily understanding the relationships between them. In disciplines like mathematics, language learning, or natural sciences, mastering these foundational elements is critical for progressing to more intricate material (Sweller, 1988). Substructuring is pivotal for learners as it ensures that they have a solid knowledge base upon which higher-level cognitive processes can be applied. This stage aligns with Piaget's (1970) concept of schema formation and is essential for the gradual development of more complex intellectual abilities.

**Level 2: Conceptualizing**

Conceptualizing represents a deeper understanding of knowledge. It involves the ability to grasp the meaning and relationships between concepts, allowing learners to move beyond rote memorization to a more nuanced comprehension of material. At this level, learners begin to synthesize and organize information in ways that reveal underlying structures and patterns.

Conceptualizing is essential for the development of higher-order cognitive skills, such as critical thinking, analysis, and synthesis. It involves both declarative knowledge (facts and information) and procedural knowledge (how to apply concepts) (Anderson, 2005). This stage also emphasizes the importance of metacognitive strategies, where learners reflect on their thinking processes and adjust their cognitive approaches to improve understanding. Once the basic knowledge has been acquired through substructuring, learners enter the conceptualizing stage, where they begin to build more sophisticated cognitive models. Conceptualizing involves not only understanding isolated facts but also recognizing and organizing relationships between concepts. At this level, learners move beyond simple memorization to comprehend the underlying principles and structures that govern the material (Anderson, 2005). The transition from concrete to abstract thinking marks this stage, as learners start to see how different pieces of information fit together and influence one another.

This stage emphasizes the development of higher-order cognitive abilities such as critical thinking, analysis, and synthesis. It is where declarative knowledge (facts and information) meets procedural knowledge (the ability to apply those facts). For instance, in mathematics, learners may move from understanding basic arithmetic operations to conceptualizing how these operations work together in algebraic equations. In science, students may progress from learning basic concepts about biology to grasping the interconnectedness of biological systems. Metacognitive strategies also emerge at this stage, where learners are able to reflect on their learning processes and adjust their approaches for deeper understanding (Anderson, 2005). This awareness of one's cognitive processes enables learners to assess and refine their understanding of concepts and improve their problem-solving techniques.

Level 3: Contemplating

Contemplating represents the highest level of cognitive manipulation in the proposed model. It involves reflective thinking, metacognition, and the evaluation of one's own cognitive processes. Learners who engage in contemplating examine their thinking strategies, question assumptions, and explore alternative viewpoints. This reflective process leads to deeper insights and a more sophisticated understanding of complex concepts.

Contemplating requires learners to engage in deliberate practice, fostering skills such as problem-solving, creativity, and self-regulation (Zimmerman, 2002). It is a crucial stage for developing expertise, as it allows learners to refine their cognitive processes and develop a deeper, more flexible understanding of the material. The highest level of cognitive manipulation is represented by contemplating, a stage in which learners engage in metacognitive reflection, critical evaluation, and thoughtful analysis of their own cognitive processes. Contemplating requires learners to actively consider the assumptions underlying their thoughts, challenge existing perspectives, and explore alternative ways of thinking about concepts (Zimmerman, 2002). It is in this phase that learners refine their cognitive frameworks and develop the ability to approach problems with greater flexibility, creativity, and depth.

Reflective thinking is at the core of contemplating, and this stage often involves deliberate practice and problem-solving to master complex concepts. Learners at this level are not only absorbing information but critically engaging with it, making adjustments to their learning strategies as needed. They begin to internalize not just the "what" but also the "how" and "why" of the material they are studying, which is crucial for expertise development (Ericsson, 2006). By fostering skills such as self-regulation and the ability to adapt cognitive approaches, contemplating helps learners achieve mastery and creative problem-solving in their fields.

For example, an advanced student of literature might engage in contemplating by critically analyzing the themes, characters, and stylistic elements of a novel, considering multiple interpretations, and refining their personal critical framework. In scientific inquiry, a researcher might engage in contemplating by questioning existing hypotheses, designing new experiments, and rethinking traditional methodologies. In this stage, learners not only understand concepts but also engage with them on a deeper, more personalized level, pushing the boundaries of their knowledge and skills (Zimmerman, 2002).

Implications for Learning

The model of cognitive manipulation has significant implications for educational practice. It suggests that learning is not merely a passive process of receiving information but an active, dynamic process of cognitive restructuring. By highlighting both linear and nonlinear thinking, the model underscores the importance of providing learners with diverse learning experiences that encourage both accuracy and creativity.

Educational environments should incorporate opportunities for both convexing (structured, linear problem-solving) and concaving (open-ended, nonlinear exploration). Tasks that require learners to engage in both types of thinking can foster a more balanced



cognitive development, supporting learners in mastering foundational knowledge while also promoting creative problem-solving and critical reflection. Furthermore, encouraging reflection and metacognition at all levels of learning can help learners become more self-aware and effective in their learning processes.

CONCLUSION

This model of cognitive manipulation provides a comprehensive framework for understanding how learners engage with knowledge. By integrating the information processing paradigm and radical constructivism, the model offers insights into the continuous, active process of learning. Through the stages of substructuring, conceptualizing, and contemplating, learners develop increasingly complex cognitive structures that allow them to manipulate knowledge in both linear and nonlinear ways. This model has important implications for educational practices, suggesting the need for a learning environment that fosters both foundational knowledge acquisition and the development of higher-order cognitive skills.

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REVIEW OF *Zingiber officinale* FOR THE TREATMENT OF THROAT INFECTIONS: TRADITIONAL AND MODERN PERSPECTIVES

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ABSTRACT

Throat infections are a common ailment, ranging from mild sore throats to severe conditions like tonsillitis and pharyngitis, often caused by bacterial, viral, or fungal pathogens. Traditional medicine has long relied on herbal remedies for such conditions, with *Zingiber officinale* (ginger) being a cornerstone treatment for its potent bioactive compounds. Ginger contains a plethora of phytochemicals, such as gingerols, shogaols, and essential oils, which exhibit significant antimicrobial, anti-inflammatory, and analgesic effects. This review synthesizes traditional practices, experimental evidence, and modern applications of ginger for throat infections. Challenges such as the lack of standardization and quality control are discussed alongside prospects for developing ginger-based therapeutics.

INTRODUCTION

Historical Significance of Ginger

- Ginger's use dates back over 3,000 years, with its mention in ancient Sanskrit texts and Chinese herbal compendiums as a remedy for respiratory ailments.
- In medieval Europe, ginger was a prized commodity, often used to treat "sore throats" and "hoarseness"

The Botanical Classification of *Zingiber officinale* :

- Kingdom: Plantae
- Order: Zingiberales
- Family: Zingiberaceae
- Genus: *Zingiber*
- Species: *Zingiber officinale*





Zingiber officinale, commonly known as ginger, is a flowering plant whose underground stems, or rhizomes, are widely utilized as a spice and for their medicinal properties. It belongs to the Zingiberaceae family, which also includes other plants like turmeric (*Curcuma longa*) and cardamom (*Elettaria cardamomum*). Native to Southeast Asia, ginger is now grown in many tropical and subtropical regions around the world. This classification reflects its relationship with other medicinal and culinary plants within the Zingiberaceae family.

Molecular Basis of Antimicrobial Action

Ginger exhibits selective toxicity towards pathogens while sparing beneficial microbiota.

- Mechanisms Against Bacteria :
 - Disrupts bacterial cell membranes, leading to leakage of essential ions.
 - Interferes with bacterial protein synthesis and enzyme activity.
- Mechanisms Against Viruses :
 - Prevents viral attachment and entry into host cells.
 - Inhibits viral RNA polymerase, disrupting replication.

Role in Symptom Management

- Pain Relief: Gingerol and shogaol desensitize pain receptors, offering immediate relief from throat discomfort.
- Mucosal Protection: Forms a protective layer over inflamed tissues, preventing further irritation.

Ginger's Role in Pediatric Care :

- Ginger-based syrups and lozenges are safe for children, offering relief from sore throats and accompanying symptoms like cough and congestion.
- Pediatric studies highlight reduced recovery times and improved appetite when ginger is part of treatment regimens.

Integration into Modern Medicine

Synergistic Formulations :

- Phytopharmaceutical Combinations: Ginger with elderberry and echinacea has shown enhanced effects against respiratory viruses.
- Adjunct Therapy: Ginger-based products can enhance the efficacy of conventional antibiotics, potentially lowering required doses.

Nanotechnology Applications :

- Development of ginger-based nanoparticles to improve solubility, bioavailability, and targeted delivery.
- Studies on ginger-loaded liposomes demonstrate prolonged anti-inflammatory activity in throat infections.

Challenges and Ethical Considerations

1. Biopiracy Risks: Unregulated use of indigenous knowledge for commercial gains poses ethical issues. Collaborative frameworks with traditional practitioners are essential.
2. Sustainability: Overharvesting of ginger plants for medicinal purposes must be balanced with conservation efforts.

Public Health Implications :

Incorporating ginger into public health initiatives could reduce the dependence on antibiotics and improve outcomes for populations in low-resource settings. Educational campaigns can promote the use of ginger as part of integrative healthcare.

Illustrations and Infographics :

1. Structure and Composition of Ginger :

- Image depicting gingerols, shogaols, and other active compounds with their functions labeled.

2. Mechanism of Action :

- Diagram showing how ginger disrupts bacterial cell membranes and prevents viral replication.

3. Practical Applications :

- Step-by-step guide to preparing ginger-based remedies like teas, lozenges, and gargles.

Throat Infections

Throat infections, including pharyngitis, laryngitis, and tonsillitis, are widespread and can significantly impact quality of life. The primary causes include:

- **Bacteria:** *Streptococcus pyogenes*, *Haemophilus influenzae*, *Moraxella catarrhalis*.
- **Viruses:** Influenza, rhinovirus, adenovirus.
- **Fungi:** *Candida albicans* in immunocompromised individuals.

Symptoms range from mild irritation to severe pain, swelling, fever, and difficulty swallowing. Conventional treatments often involve antibiotics, analgesics, and throat sprays. However, the growing resistance to antibiotics and concerns about side effects necessitate alternative remedies.



Importance of Herbal Remedies

Herbal medicines are deeply ingrained in traditional healthcare systems. Their multi-targeted mechanisms, biocompatibility, and historical safety records make them appealing alternatives to synthetic drugs. Ginger, among the most studied herbs, offers therapeutic benefits backed by centuries of use and modern scientific validation.

Zingiber officinale as a Therapeutic Agent

Ginger has been cultivated and used in Ayurvedic, Chinese, and Unani systems of medicine for thousands of years. Beyond its culinary use, its bioactive components are recognized for antimicrobial, anti-inflammatory, and antioxidant properties, making it an effective natural remedy for respiratory and throat infections.

Phytochemistry of Zingiber officinale

Active Compounds :

Ginger's medicinal properties stem from its rich phytochemical profile, which includes:

1. **Phenolic Compounds :**
 - **Gingerols:** The primary pungent compounds with potent antimicrobial and anti-inflammatory effects.
 - **Shogaols:** Formed from gingerols during drying or cooking, with enhanced pharmacological properties.
 - **Paradol:** Provides antioxidant and pain-relieving benefits.
2. **Terpenoids :**
 - **Zingiberene, curcumene, and farnesene** contribute to its anti-inflammatory and antibacterial effects.
3. **Essential Oils :**
 - Contain α -zingiberene, camphene, and β -bisabolene, used in aromatherapy and topical treatments.
4. **Flavonoids :** Enhance immune response and protect mucosal linings from oxidative damage.

Pharmacokinetics

The bioavailability of ginger compounds varies based on formulation and consumption method. Studies show that gingerol is absorbed in the stomach and small intestine, where it exerts localized anti-inflammatory effects. Shogaol, being more stable, remains bioactive in the bloodstream for longer durations.

Extraction and Standardization :

- **Ethanollic Extracts:** Yield high concentrations of gingerols and terpenoids, particularly effective for antimicrobial applications.
- **Aqueous Extracts:** Retain water-soluble compounds beneficial for throat rinses and teas.
- **Supercritical CO₂ Extraction:** Advanced technique for obtaining highly potent ginger oil fractions.

Mechanisms of Action

Anti-inflammatory Effects

Ginger reduces inflammation in throat infections by:

- Inhibiting key enzymes such as cyclooxygenase (COX) and lipoxygenase (LOX).
- Suppressing inflammatory mediators like prostaglandins, leukotrienes, and cytokines.
- Stabilizing mast cells to prevent histamine release.

Antimicrobial Properties

Ginger's antimicrobial spectrum includes:

- **Gram-Positive Bacteria:** Effective against *Streptococcus pyogenes*, a primary cause of bacterial throat infections.
- **Gram-Negative Bacteria:** Inhibits *Haemophilus influenzae* and *Moraxella catarrhalis*.
- **Fungal Pathogens:** Prevents the growth of *Candida albicans* by targeting fungal cell wall synthesis and biofilm formation.

Antiviral Activity

- Inhibits replication of respiratory viruses like influenza and rhinovirus by modulating immune responses and directly interacting with viral proteins.

Antioxidant Activity

- Neutralizes ROS, which contribute to mucosal damage and prolong inflammation in throat infections.

Analgesic Effects

- Interacts with transient receptor potential (TRP) channels to reduce the perception of pain and soothe throat irritation.



Traditional Use in Throat Infections

Ethnomedicinal Practices

Ginger's traditional uses for throat infections vary across cultures :

- **Ayurveda** : Combines ginger with honey and black pepper for sore throat and cough relief.
- **Chinese Medicine** : Uses fresh ginger decoctions for treating colds and throat infections.
- **African Practices** : Chewing fresh ginger roots is a common remedy for sore throats.

Regional and Cultural Practices

1. **Southeast Asia** : Ginger tea mixed with lemongrass for its antimicrobial and soothing properties.
2. **Middle East** : Decoctions of ginger with lemon and mint for throat infections and general immunity.
3. **South America** : Ginger paste applied to the throat externally for localized anti-inflammatory effects.

Modern Research Evidence

In Vitro Studies

- Ginger extracts exhibit significant zones of inhibition against throat-infecting bacteria and fungi, especially *S. pyogenes* and *C. albicans*.
- A study showed ethanolic extracts of ginger were more effective than aqueous extracts in disrupting biofilm formation by bacterial pathogens.

In Vivo Studies

- Animal models demonstrate that ginger reduces throat mucosal swelling and bacterial loads in pharyngitis.
- Rats treated with gingerol showed rapid recovery from induced throat inflammation.

Clinical Trials

- Randomized trials have reported significant reductions in pain, inflammation, and microbial load in patients using ginger lozenges compared to control groups.
- In a study combining ginger with honey, the duo was found to accelerate recovery in children with bacterial pharyngitis.

Comparative Effectiveness

Ginger vs. Synthetic Drugs

- Gingerol's antibacterial activity is comparable to penicillin against specific pathogens but with fewer side effects like gastrointestinal upset.

Combination Therapies

- Ginger enhances the efficacy of antibiotics by disrupting bacterial biofilms and reducing resistance mechanisms.

Dosage Forms and Administration

Traditional Preparations

- **Teas** : Ginger boiled in water with honey and lemon for immediate symptom relief.
- **Decoctions** : Concentrated extracts prepared by boiling ginger with spices like turmeric and clove.

Modern Formulations

- **Capsules** : Containing standardized doses (250–500 mg) of ginger extract.
- **Sprays** : Ginger-based throat sprays provide targeted relief.
- **Lozenges** : Offer slow-release of ginger's bioactives for sustained soothing effects.

Recommended Dosages

Effective doses range between 1-2 grams of dried ginger powder or its equivalent in extracts, consumed 2-3 times daily.

Safety and Toxicity

Adverse Effects

Ginger is generally well-tolerated but may cause mild gastrointestinal discomfort at high doses. Rare allergic reactions have been reported.



Toxicological Studies

Toxicity studies in rodents indicate ginger's safety at doses up to 5 g/kg body weight, far exceeding typical human consumption levels.

Drug Interactions

- Ginger may enhance the effects of anticoagulants, requiring careful monitoring in patients on such medications.

Challenges and Limitations

Quality Control

The variability in bioactive compound content due to cultivation, storage, and preparation methods poses a challenge for consistent efficacy.

Standardization Issues

Lack of standardized ginger formulations in herbal medicine limits reproducibility of clinical outcomes.

Limited Large-Scale Trials

More robust, multicentric trials are needed to validate ginger's effectiveness as a treatment for throat infections.

Future Perspectives

1. **Molecular Research** : Advanced studies on the interaction of ginger bioactives with bacterial and viral proteins.
2. **Novel Drug Development** : Designing pharmaceutical formulations using purified ginger compounds.
3. **Global Cultivation Programs** : Enhancing ginger production while ensuring sustainable farming practices.

CONCLUSION

Zingiber officinale demonstrates significant promise as a natural remedy for treating throat infections due to its potent anti-inflammatory, antimicrobial, and antioxidant properties. Its traditional use provides valuable insights, which are being substantiated by modern scientific research. However, several challenges remain, such as achieving standardization in formulations and ensuring accurate dosage. To fully integrate ginger into contemporary healthcare, it is crucial to address these issues through more rigorous research, including large-scale clinical trials. Additionally, exploring the synergy between ginger and other natural compounds could enhance its therapeutic effects. By doing so, there is potential to reduce reliance on antibiotics and improve health outcomes, particularly in low-resource settings. Future efforts should focus on developing standardized ginger-based treatments and advancing drug delivery technologies to maximize its effectiveness.

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USER DATA-CENTRIC AUTHENTICATION FOR NETWORK DATA RETRIEVAL

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ABSTRACT

Big data introduces significant demands on network infrastructure, necessitating secure and efficient data retrieval with in-network caching. Information-Centric Networking (ICN) addresses these challenges by caching data across intermediate physical entities (IPEs) and enabling retrieval from nearby sources. However, unpredictable behaviors of users, IPEs, and publishers during data retrieval introduce risks such as malicious data-poisoning and request flooding. Existing systems primarily authenticate between users and publishers, resulting in increased delays and network vulnerabilities. To resolve these issues, we propose DC Auth, a trust model integrating Certificate Authority (CA)-based and neighbor-based trust to achieve efficient and secure data-centric authentication. Simulations confirm that DC Auth significantly reduces delays while enhancing security by mitigating various attacks.

1. INTRODUCTION

The exponential growth in mobile devices and IoT has dramatically increased the demand for big data services. Traditional end-to-end communication models in big data retrieval result in substantial redundancy and latency. ICN provides a transformative solution by caching data closer to users, reducing redundancy and improving latency. However, in-network retrieval introduces new vulnerabilities, such as malicious-request and data-poisoning attacks. Unlike conventional Internet models with predictable trust paths, ICN necessitates a robust authentication framework to mitigate these risks. This research presents DC Auth, a suspension-chain-based trust model designed to secure bigdata retrieval by combining CA-based and neighbor-based trust mechanisms. In today's digital age, the exponential growth in big data and IoT applications has imposed significant demands on network infrastructure. Traditional end-to-end communication models face challenges such as redundancy and latency in data retrieval. Information-Centric Networking (ICN) offers an alternative by caching data across intermediate physical entities (IPEs). However, this architecture introduces vulnerabilities, such as malicious requests and data poisoning attacks, due to unpredictable user and network behaviors. Existing models rely on centralized authentication, leading to higher latency and limited scalability. This paper addresses these challenges by proposing DC Auth, an efficient data-centric authentication system that utilizes a Suspension Chain Model for trust-based in-network authentication.

1.1 OBJECTIVE

The objective of this research is to develop a robust data-centric authentication mechanism for ICN environments. By integrating CA-based trust and neighbor-based trust into a suspension-chain model, DC Auth aims to authenticate unpredictable network entities securely. This system not only ensures data integrity but also minimizes latency and effectively combats malicious attacks in big data networks, providing a practical and scalable solution for modern network infrastructures. The objective of this research is to design a scalable and secure authentication framework for ICN environments. DC Auth integrates CA-based trust with neighbor-based trust mechanisms, enabling dynamic and reliable data retrieval. The system aims to: Minimize authentication delays. Mitigate security threats like request flooding and cache poisoning. Ensure seamless scalability and low-latency communication.

1.2 SCOPE OF THE PROJECT

The scope of this project involves developing a scalable framework using a suspension-chain model to secure in-network big data retrieval. DC Auth integrates seamlessly into network environments by utilizing trust-based certificate chains for authentication. Decentralizing trust mechanisms minimizes dependency on centralized servers, ensuring robust security even in dynamic, large-scale networks with low-latency performance. This solution can be applied to diverse ICN-based applications, ranging from IoT ecosystems to cloud computing environments, enhancing overall network resilience and security.

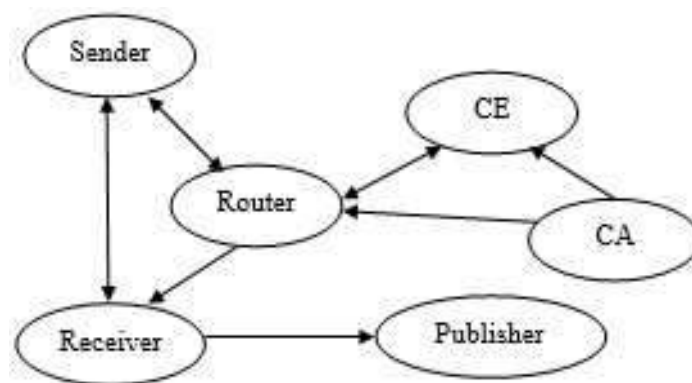


1.3. EXISTING SYSTEM

Existing big data retrieval models struggle with inefficiencies and vulnerabilities, especially in unpredictable environments. Traditional authentication systems, which rely heavily on centralized servers, fail to address critical security concerns such as malicious-request and data-poisoning attacks. Moreover, centralized systems often suffer from increased latency and lack scalability, making them inadequate for modern decentralized networks. This research aims to overcome these limitations by proposing a data-centric authentication system that enhances network resilience and security without relying on centralized resources.

Current systems in big data networks primarily rely on centralized authentication models that authenticate interactions between users and publishers. However, these systems suffer from prolonged authentication delays and vulnerabilities to various attacks, including cache poisoning and request flooding. The reliance on centralized servers increases latency and introduces single points of failure, making the system less efficient and more susceptible to breaches. Conventional authentication systems struggle with inefficiencies in dynamic network environments. Centralized authentication models introduce high latency and expose networks to attacks such as cache poisoning and request flooding. Additionally, existing models fail to ensure privacy and scalability in handling large-scale data retrievals. This paper proposes a data-centric authentication model to address these challenges, enhancing both security and performance.

1.3.1 SYSTEM ARCHITECTURE



EXPLANATION

The proposed system architecture incorporates a suspension-chain model that integrates CA-based and neighbor-based trust for seamless authentication. This architecture ensures real-time validation of data and users, significantly reducing the risk of malicious activities. By embedding authentication processes into data forwarding mechanisms, the system minimizes delays and enhances security across various network nodes.

The proposed DC Auth System Architecture introduces a distributed trust model using Suspension Certificate Chains. The architecture consists of:

User Module: Generates and forwards data requests.

Router Module: Validates certificates using suspension chains.

Publisher Module: Authenticates and provides data securely.

Certificate Authority (CA): Issues and manages certificates for network entities.

The system ensures real-time validation through hop-by-hop trust verification, significantly reducing delays.

The DC Auth system employs a multi-layered approach involving data caching, trust verification, and secure packet forwarding. The suspension-chain model enables dynamic trust establishment between network entities, ensuring continuous authentication without centralized dependency. The trust chain is established through certificates exchanged between neighboring entities, significantly reducing authentication time and enhancing overall system performance.

1.3.2 EXISTING SYSTEM DISADVANTAGES

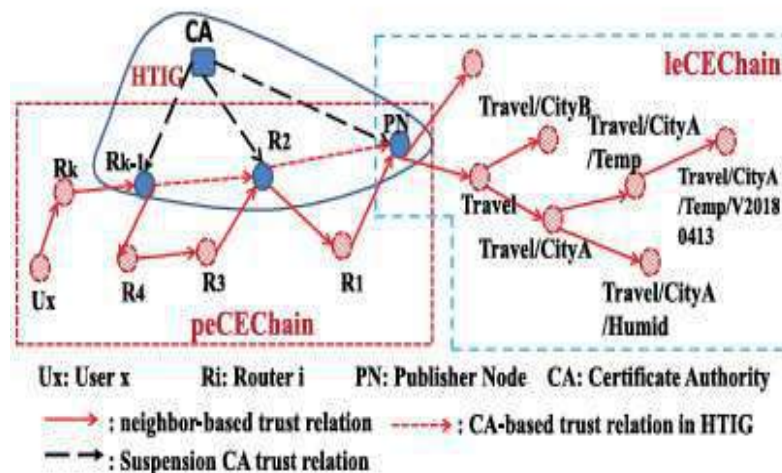
High Latency: Centralized authentication processes significantly increases delays.

Vulnerability to Attacks: Susceptible to malicious-request and data-poisoning attacks.

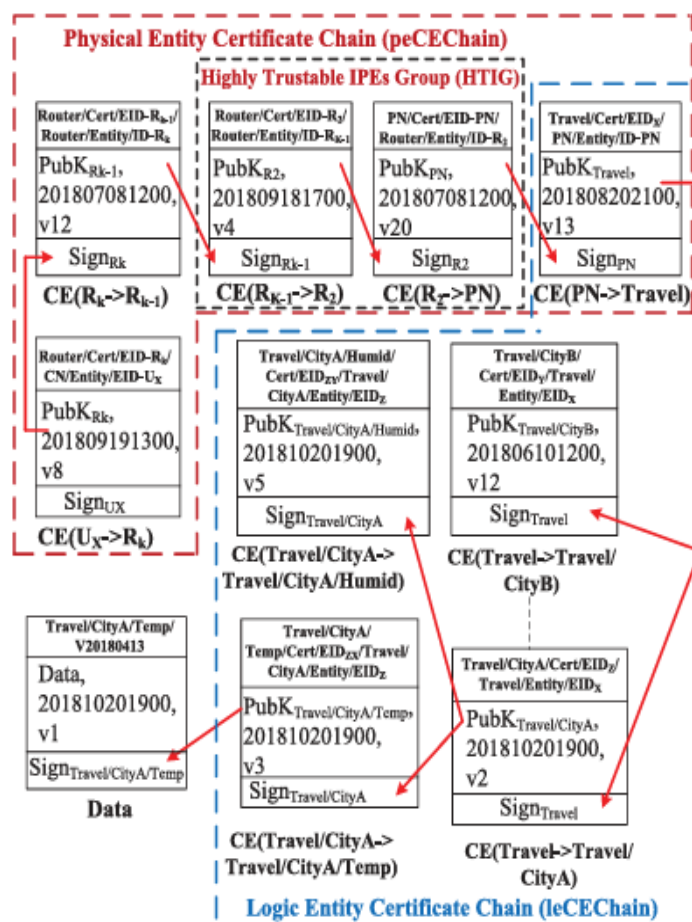
Limited Scalability: Heavy reliance on centralized servers restricts system scalability.

1.4 PROPOSED SYSTEM

The DC Auth model introduces a novel approach to secure big data retrieval in ICN environments. By integrating CA-based and neighbor-based trust, DC Auth creates a robust suspension-chain that seamlessly authenticates users, IPEs, and publishers. Unlike traditional models, DC Auth embeds authentication within the data transmission process, enabling real-time validation without relying on central servers, thereby enhancing security and reducing latency.



(a) Trust Relation



(b) Suspension certificate chain



1.4.1 PROPOSED SYSTEM ADVANTAGES

Enhanced Security: Protection against malicious-request and data-poisoning attacks.

Low Latency: Decentralized certificate management minimizes authentication delays.

Scalability: Seamless integration into ICN frameworks ensures adaptability for large-scale networks.

DESCRIPTION GENERAL

DC Auth leverages ICN principles to create a secure and efficient environment for big data retrieval. By embedding authentication into data packets, the system ensures that all data exchanges are verified for authenticity and integrity, reducing the risk of unauthorized data access or tampering.

2.METHODOLOGIES

2.1 MODULES NAME

User Interface Design

User Module

Router Module

Certificate Authority Module

Publisher Module

User Interface Design

Enables users to authenticate and interact with the system securely.

Router Module

Facilitates certificate exchange and manages secure routing .

Certificate Authority Module

Issues and verifies certificates for network entities.

Publisher Module

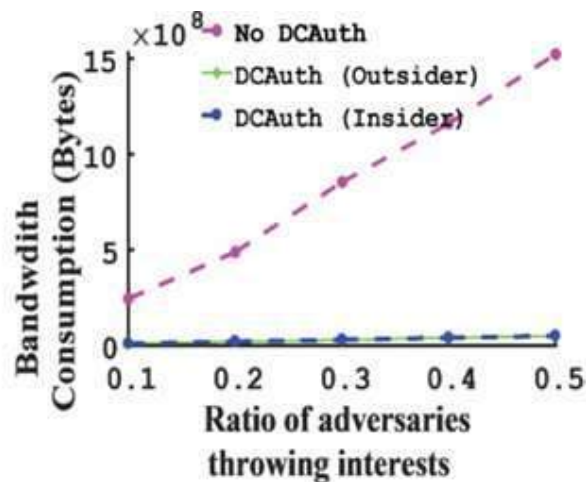
Ensures data authenticity and integrity before distribution.

2.2 TECHNIQUES USED

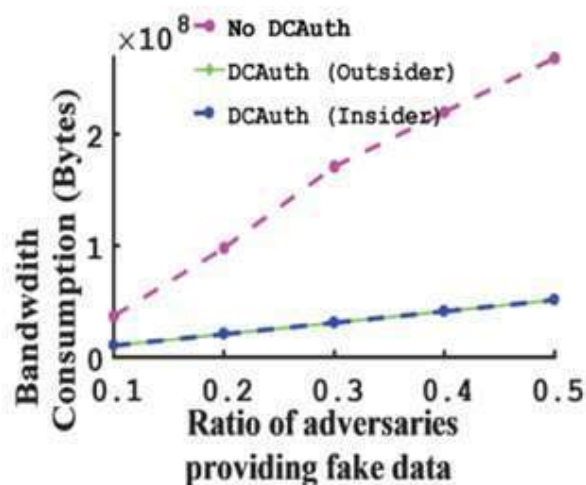
The system utilizes the DC Auth Algorithm, which incorporates trust chains and data-centric authentication. By leveraging neighbor-based and CA-based trust models, DC Auth ensures secure communication across all network layers, mitigating the risks associated with malicious data exchanges and unauthorized access.

3.RESULT

Simulations of the DC Auth model demonstrate significant improvements in network security and performance. The system achieves a high accuracy rate in detecting and mitigating attacks, significantly reducing latency compared to traditional authentication methods. Extensive testing indicates that DC Auth not only enhances data integrity but also ensures faster, more secure data retrieval in ICN environments.



Bandwidth consumption under Interest flooding attack.



Bandwidth consumption under fake data attack.

4. FUTURE ENHANCEMENT

Future enhancements of DC Auth will focus on integrating advanced machine learning algorithms to dynamically detect and respond to emerging threats. Additionally, incorporating biometric authentication and blockchain technology could further strengthen the system's security. Expanding the framework to include IoT-specific protocols will enhance its applicability in diverse, large-scale environments, setting new standards in secure network communication.

5. CONCLUSION

In-network big data retrieval is inherently vulnerable to security risks such as malicious requests and data-poisoning attacks. The proposed DC Auth model addresses these challenges by providing a robust, data-centric authentication mechanism that combines CA-based and neighbor-based trust. By integrating authentication into the data forwarding process, DC Auth significantly reduces latency and enhances security, making it a scalable and efficient solution for modern ICN environments.

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CAREFUL DDOS SECLUDING WITH QUICK LPM

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ABSTRACT

Can volumetric distributed denial-of-service (DDoS) streams be effectively dampened by software-based packet filters in an era when 10 Gbps links are considered slow? The potential of LPM to enforce precise DDoS scrubbing policies seems to be underutilized in contemporary packet filtering data paths, as we argue in this paper that whitelist/blacklist LPM-based filtering can be made effective with commodity hardware. Because of its lockless architecture and small memory footprint of LPM structures, our suggested showcase data path has a healthy scaling potential and can evaluate multiple queries in large separate LPM databases for each forwarded 64-byte packet while maintaining a 10 Gbps line rate on a single CPU core. We demonstrated how to send 64 million by using only six CPU cores.

KEYWORDS: Firewalls, Network Security, Packet Lookup and Classification, Software Routers

Internet service providers (ISPs) and datacenter operators are facing an increasing burden due to the proliferation of volumetric/flooding distributed denial-of-service (DDoS) attacks [1], which are still primarily IPv4-based and take advantage of the openness and simplicity of the Internet's addressing and routing architecture.

General-purpose operating systems (OS) with legacy software firewalls were created when 100 Mbps and 1 Gbps were regarded as fast. Additionally, software data paths have changed to generalizations like OpenFlow [2]. Nevertheless, the precise flow tracking/caching paradigm has many inherent architectural limitations [3].

It is widely acknowledged that packet processing software data paths of non-essential functions need to be simplified and reduced, as evidenced by the widespread adoption of fast packet I/O frameworks that map NIC buffers straight into user space, like DPDK [4] or Net map [5]. Within a running Linux kernel, eBPF/XDP [6], [7], are taking a fresh look at the idea of safely translating packet filtering programs from bytecode to native machine code (JIT) [8], making it more flexible.

Only a small number of software data path proposals from the recent literature—both user space and XDP-based—have examined the advancements in longest prefix matching (LPM) documented over the previous ten years, which is an unexpected commonality. Rare exceptions, like the Kamuee router [10]. A suitable scheme should have compactly encoded lookup structures that can be searched using a straightforward and non-overly branchy process. Since branch prediction machinery and CPU out-of-order execution produce diminishing returns when working on essentially random data patterns, our main objective is to filter traffic based on queries across multiple large IP address datasets. It should ideally be adaptable enough to accommodate both more general subnet addressing and particular IP prefixes. Additionally, the scheme should function well with both more localized patterns typical of large botnets that transmit with legitimate source addresses and primarily random traffic patterns, which are characteristic of situations where attackers are successful at source address spoofing. Lastly, the plan shouldn't have structural restrictions that are too limited.

II. EXISTING SYSTEM

Distributed Denial-of-Service (DDoS) attacks are thwarted by Ternary Content-Addressable Memory, or TCAM.

Ternary Content Addressable Memory (TCAM) is a type of memory that routers use to store routing rules and categorize packets in order to protect against DDoS attacks.

DISADVANTAGES

- Limited scalability: extensive DDoS attacks might not be supported by TCAMs.
- Rule complexity: More TCAM entries might be needed for complex rules.
- Dynamic IP address handling challenges: TCAMs have trouble managing dynamic IP addresses.



III. PROPOSED SYSTEM

To swiftly isolate malicious traffic, the suggested system employs a "Careful DDoS Secluding with Quick LPM" technique. The system can quickly identify and stop DDoS attacks by using fast LPM to carry out high-speed packet filtering and pattern matching. By lowering the possibility of false positives and minimizing the impact on legitimate traffic, this solution aims to increase response times and accuracy. Our strategy seeks to offer a scalable and effective real-time DDoS detection and mitigation solution.

ADVANTAGES

- Filtering malicious packets quickly.
- Follows for massive DDOS attacks.
- provides a high degree of security for networks.

IV. RELATED WORK

For more than 20 years, the idea of dynamically recompilable data paths has been actively investigated; in 1999, a report on a BPF optimizer that was JIT compiled was published [8]. Recent improvements include eXpress Data Path (XDP) and extended BPF (eBPF), which were developed with an emphasis on quick packet processing and safe execution of potentially untrusted code in the Linux kernel. As a result, they place many restrictions on the code's structure to ensure that the kernel-level verifier finds it acceptable.

A baseline packet dropping throughput of 24 Mpps on a single core was reported by Reference [7], who used a program that blindly dropped all packets without ever accessing their headers or updating any counters. This was more than twice what we were able to accomplish with XDP. However, the 7.3 Mpps we observed is more consistent with other recent XDP reports, such as [6], which vary between about 2.2 and 6.6 Mpps.

Managing DDoS is the primary driving force behind many XDP-based proposals, which are primarily concerned with end host protection. Performance evaluations are absent from early reports like [26] and [27]. The trade-off between software and hardware for end host protection is examined in Reference [24]. Through the use of four CPU cores and hardware-assisted preprocessing on a Smart NIC with XDP running in software, their hybrid solution enables traffic to be dropped at rates of roughly 14 to 35 Mpps for 1000 malicious IP addresses. The same is true for [25], who report packet dropping rates of up to 14.88 Mpps and support eBPF/XDP for end host DDoS protection in addition to a Smart NIC that offloads some processing. They don't, however, offer a performance assessment for a use case involving a middlebox firewall.

The majority of the packet filtering proposals that were encountered, including those that were XDP-based, had one thing in common: they frequently ignored the possibility of utilizing large LPM.

Datasets for creating novel methods of DDoS scrubbing. A single-core throughput of 3.4 Mpps was observed with XDP when Reference [7] exercised a single LPM database with 752,138 distinct routes and only 4,000 random IPv4 addresses. This is much less than RPF with multiple LPM datasets and streams of fully randomized IPv4 addresses, and hardly enough to forward regular traffic at 10 Gbps. Notably, [29] suggests a method for DDoS dampening that is comparable to ours: a user space datapath that uses a sizable LPM dataset for DIR-24-8 [9] based blacklisting and DPDK for packet I/O.

P4 [31], a datapath description language, is a more generalized development for specifying packet data paths that can be compiled for both hardware and software. Although software firewalls like [32] can be built with it, they are still unable to achieve the throughput levels necessary to handle actual DDoS situations.

V. METHODOLOGIES

MODULES NAME

1. User
2. Admin
3. DDoS Detection

MODULES EXPLANATION AND DIAGRAM

➤ USER

We create the project's windows in this module. All users can securely log in using these windows. Users must enter their username and password in order to connect to the server; only then can they do so. The user can log in to the server directly if they have already left; if not, they must register their information, including their username, password, and email address. To maintain the upload and download rate, the server will create an account for every user. The user ID will be set to the name. Usually, logging in allows you to access a particular page.



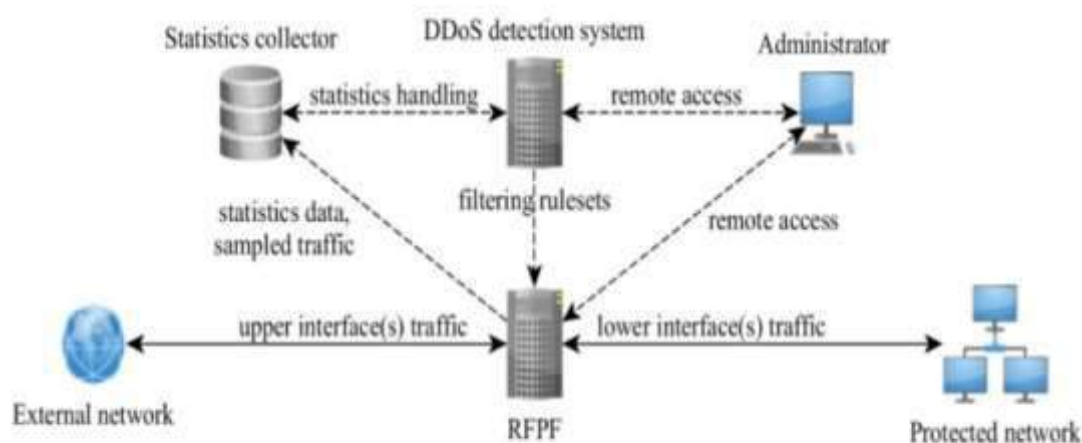
➤ ADMIN

The first module where users can register and log in is this one. Once the user has logged in, they can search the files by name. A request can also be sent to the server by a data user. After the server approves the request, the user can obtain the owner's permissions and download the file in plain text.

➤ DDOS DETECTION

When dealing with DDoS traffic, a filtering datapath's job is to swiftly transfer packets from one interface to another after classifying them and taking the necessary action, all the while maintaining basic operating statistics. Diverting manageable volumes of samples to a different packet processor for in-depth analysis is another example of a secondary function. If an attack occurs, an external tool, like a DDoS detection system, may create filtering rulesets using the sampled packets and traffic statistics that were gathered.

VI. SYSTEM ARCHITECTURE



In this project data owner has a register all details and then login. the module addresses the challenge of DDoS (Distributed Denial of Service) attacks. It outlines the need for a filtering datapath that efficiently moves packets between interfaces while classifying them and applying necessary actions. This system will also collect basic operating statistics and may divert a manageable number of packets for detailed analysis by an external DDoS detection tool. This tool can utilize the sampled packets and traffic statistics to create filtering rules in the event of an attack, ensuring the server remains secure and operational.

VII. RESULT

The range of modern DDoS firefighting techniques includes filtering in end hosts before packets enter the network stack, which is where a large portion of the current XDP-based development is happening, and using BGP to blackhole victims' addresses and declare defeat in order to reduce the amount of time that other datacenter infrastructure components are disrupted. By using middleboxes to scrub malicious traffic floods before packets reach end hosts, we aimed to restore focus to the center of this spectrum with this paper. Using a filtering data path designed specifically for forwarding speed and fast LPM, we have shown that we can forward traffic at speeds greater than 60 Mpps (i.e., 40 Gbps line rate with 64-byte packets) on a consumer-grade 8-core machine while submitting each packet to a series of LPM queries in databases, each encompassing several hundred thousand network prefixes or host addresses.

**FIG: USER PROFILE****FIG: SECURITY**

VIII. CONCLUSION

Modern DDoS firefighting methods include declaring defeat and blocking victims' addresses via BGP to minimize disruptions. Modern DDoS firefighting methods include declaring defeat and blocking victims' addresses via BGP to minimize disruptions. The performance of a filtering data path depends on the LPM scheme used. Some popular schemes may not be suitable for blacklisting applications with large address datasets due to structural limitations, such as insufficient memory for next hop labeling or specific prefixes.

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REVIEW ON THROAT INFECTIONS AND THEIR AYURVEDIC TREATMENTS

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INTRODUCTION

A throat infection, also known as pharyngitis, is an inflammation or irritation of the throat that can cause discomfort, pain, or difficulty swallowing. It is a common condition and can affect people of all ages. Throat infections can be caused by various factors, including viruses, bacteria, allergens, or irritants.

Common Causes :

1. Viral Infections (most common) :
 - Common cold
 - Influenza (flu)
 - Mononucleosis (Epstein-Barr virus)
 - COVID-19
2. Bacterial Infections :
 - Streptococcal pharyngitis (strep throat): Caused by *Streptococcus pyogenes*.
 - Diphtheria (rare in vaccinated populations)
3. Fungal Infections :
 - Oral thrush caused by *Candida* species, particularly in immunocompromised individuals.
4. Other Causes :
 - Allergies (e.g., pollen, dust)
 - Smoking or exposure to pollutants
 - Acid reflux (gastroesophageal reflux disease, GERD)
 - Excessive dryness (from dry air or dehydration)

Throat infections are a common ailment affecting people of all ages, ranging from mild irritations to severe complications. These infections often result in discomfort, difficulty in swallowing, and a significant impact on daily activities. Ayurveda, an ancient Indian system of medicine, offers holistic and natural remedies for treating throat infections. This article delves into the types of throat infections, their symptoms, and Ayurvedic approaches for prevention and treatment.

Types of Throat Infections





Throat infections are classified based on their cause and severity. Below are the most common types :

1. **Pharyngitis**

Pharyngitis refers to inflammation of the pharynx, located at the back of the throat. This condition often results from viral or bacterial infections.

- **Viral Pharyngitis** : Caused by viruses such as the common cold, influenza, or mononucleosis.
- **Bacterial Pharyngitis** : Often caused by *Streptococcus pyogenes* (strep throat).

Symptoms

- Sore throat
- Swelling and redness
- Difficulty swallowing
- Fever and fatigue

2. **Tonsillitis**

Tonsillitis is the inflammation of the tonsils, two lymph nodes located at the back of the throat. It can be viral or bacterial.

- Chronic tonsillitis may require further intervention if it becomes recurrent.

Symptoms

- Painful throat
- Swollen tonsils, often with white patches
- Difficulty swallowing
- Ear pain and bad breath

3. **Laryngitis**

Laryngitis involves inflammation of the larynx or voice box, primarily due to viral infections, overuse of the voice, or environmental factors.

Symptoms

- Hoarseness or loss of voice
- Sore throat
- Dry cough

4. **Epiglottitis :**

This is a potentially serious bacterial infection that causes inflammation of the epiglottis, a flap that covers the windpipe. It is a medical emergency requiring prompt attention.

Symptoms :

- Severe throat pain
- Difficulty breathing
- Fever

5. **Postnasal Drip**

Though not an infection itself, postnasal drip often accompanies or exacerbates throat infections. It occurs when excessive mucus from the sinuses drips down the throat, causing irritation.

6. **Bacterial Infections**

• **Strep Throat (Caused by *Streptococcus pyogenes*) :**

- One of the most common bacterial throat infections.
- Highly contagious and spread through respiratory droplets.
- Symptoms: Severe sore throat, fever, red and swollen tonsils with white patches, and swollen lymph nodes.

• **Diphtheria (*Corynebacterium diphtheriae*) :**

- A rare but serious bacterial infection.
- Characterized by a thick, gray membrane covering the throat and tonsils.
- Symptoms: Difficulty breathing, sore throat, fever, and swollen glands.

7. **Viral Infections**

• **Common Cold Viruses (Rhinoviruses, Coronaviruses) :**

- Often lead to pharyngitis.
- Symptoms include a mild sore throat, nasal congestion, and sneezing.

• **Influenza Virus :**

- Causes severe throat pain as part of systemic flu symptoms.
- Symptoms: High fever, body aches, fatigue, and dry throat.

• **Epstein-Barr Virus (Mononucleosis) :**

- Known as "mono" or the "kissing disease."



- Symptoms: Sore throat, extreme fatigue, swollen tonsils, and enlarged spleen.

8. Fungal Infections

- **Oral Thrush (Caused by *Candida albicans*) :**
 - Common in individuals with weakened immune systems or those using inhaled corticosteroids.
 - Symptoms: White patches in the throat, pain, and difficulty swallowing.

9. Other Infections

- **Postnasal Drip-Associated Irritation :**
 - Caused by chronic sinusitis or allergies.
 - Symptoms: Persistent cough, throat clearing, and mucus accumulation.
- **Environmental or Chemical Irritation :**
 - Smoking, pollution, or exposure to irritants can mimic infection symptoms.
 - Symptoms: Chronic sore throat and irritation.

Causes of Throat Infections

Understanding the underlying causes of throat infections is crucial for effective treatment.

1. **Viral Infections :** Most throat infections, such as pharyngitis and laryngitis, are caused by viruses.
2. **Bacterial Infections :** Bacteria like *Streptococcus pyogenes* lead to strep throat and severe tonsillitis.
3. **Fungal Infections :** Rarely, fungi like *Candida albicans* cause throat infections, especially in individuals with weakened immunity.
4. **Allergies and Irritants :** Allergens, pollutants, and smoking can exacerbate throat irritation and infections.
5. **Weak Immunity :** Poor immunity makes individuals more susceptible to infections.

Complications of Throat Infections

Untreated or improperly managed throat infections can lead to :

1. **Rheumatic Fever :**
 - A complication of untreated strep throat leading to heart and joint inflammation.
2. **Peritonsillar Abscess :**
 - Pus-filled swelling near the tonsils, causing severe pain and difficulty swallowing.
3. **Airway Obstruction :**
 - Severe swelling, as seen in epiglottitis, can block the airway.
4. **Post-Streptococcal Glomerulonephritis :**
 - A kidney complication following strep throat.

Modern Diagnosis of Throat Infections

1. **Clinical Examination :**
 - Physical examination of the throat using a tongue depressor.
 - Checking for redness, swelling, and pus on the tonsils.
2. **Laboratory Tests :**
 - Throat Swab Culture: Identifies bacterial infections like strep throat.
 - Rapid Antigen Detection Test (RADT): Quick test for strep throat.
3. **Blood Tests :**
 - Used for viral infections like mononucleosis to detect specific antibodies.
4. **Imaging Studies :**
 - X-rays or CT scans to diagnose severe infections like abscesses or epiglottitis.

Ayurvedic Perspective on Throat Infections

Ayurveda views throat infections as a result of an imbalance in the three doshas: **Vata**, **Pitta**, and **Kapha**. These imbalances can lead to inflammation, dryness, or mucus buildup in the throat. Ayurvedic texts describe throat ailments under conditions such as **Kasa** (cough), **Shwasa** (breathing disorders), and **Tundikeri** (tonsillitis-like symptoms).

1. **Vata Imbalance**
Dryness and hoarseness in the throat. Often associated with cold and dry weather.
 - Symptoms: Dry cough, pain without swelling.
2. **Pitta Imbalance**
Inflammation and redness in the throat. Triggered by infections or hot, spicy food.
 - Symptoms: Burning sensation, fever, and swelling.



3. Kapha Imbalance

Mucus accumulation and congestion. Usually seen in colder climates or during allergy seasons.

- Symptoms: Mucus discharge, heaviness, and persistent cough

Ayurvedic Classification of Throat Disorders

Ayurvedic texts classify throat infections under :

1. **Tundikeri**
 - Resembles tonsillitis, with swelling and difficulty swallowing.
2. **Kasa**
 - Associated with coughing and throat irritation due to respiratory issues.
3. **Shwasa**
 - Covers breathing difficulties linked to throat inflammation.
4. **Ardra Swarabheda**
 - Hoarseness or loss of voice due to infections.

Ayurvedic Treatments for Throat Infections

Ayurveda employs natural remedies, dietary modifications, and lifestyle practices to treat throat infections holistically. The goal is to balance the doshas, alleviate symptoms, and strengthen immunity.

1. Dietary Remedies (Ahara)

Diet plays a crucial role in managing throat infections. Ayurveda recommends:

- **Warm Foods and Drinks** : Consuming warm herbal teas, soups, and water helps soothe the throat.
- **Avoidance of Certain Foods** : Cold, sour, and fried foods aggravate throat conditions.
- **Ginger and Honey** : A mixture of ginger juice and honey is highly effective for relieving sore throat and cough.
- **Turmeric Milk (Haldi Doodh)** : Turmeric has anti-inflammatory and antibacterial properties. Drinking warm milk with turmeric provides relief.
- **Licorice Root (Mulethi)** : Chewing licorice root or drinking it as tea soothes throat pain.

2. Herbal Remedies (Dravyaguna)

Ayurvedic herbs with antimicrobial, anti-inflammatory, and soothing properties are the mainstay of treatment:

- **Tulsi (Holy Basil)** : Tulsi leaves boiled in water or consumed as tea alleviate throat infections due to their antiviral and antibacterial properties.
- **Neem** : Neem's antibacterial properties are effective against infections. Gargling with neem water provides relief.
- **Cloves (Lavang)** : Rich in eugenol, cloves have numbing and anti-inflammatory effects. Sucking on a clove relieves pain.
- **Cinnamon (Dalchini)** : Cinnamon tea or warm water with cinnamon helps reduce inflammation and combats infection.
- **Fenugreek (Methi)** : Gargling with fenugreek seed water relieves throat pain.

3. Therapeutic Procedures

Ayurveda prescribes specific procedures for throat infections:

- a. **Oil Pulling (Gandusha)** :
Swishing warm sesame oil or coconut oil in the mouth removes toxins and relieves dryness and inflammation.
- b. **Gargling (Kavala)** :
Gargling with herbal decoctions made from turmeric, salt, or Triphala provides instant relief.
- c. **Steam Inhalation (Swedana)** :
Inhaling steam infused with eucalyptus or camphor clears congestion and reduces mucus buildup.

4. Medicinal Formulations

Traditional Ayurvedic formulations are highly effective for throat infections:

- **Sitopaladi Churna** : A powdered mix of herbs that alleviates throat irritation and boosts immunity.
- **Talisadi Churna** : Useful for managing cough and mucus-related throat issues.
- **Kantakari Avaleha** : A herbal jam for soothing throat pain and inflammation.

5. Yoga and Pranayama

Yoga and breathing exercises strengthen respiratory health and aid recovery:

- **Ujjayi Pranayama** : This slow breathing technique soothes the throat and improves oxygen flow.
- **Humming Bee Breathing (Bhramari Pranayama)** : Relieves throat irritation and reduces stress.



- **Neck Stretches** : Simple stretches relax throat muscles and improve circulation.

Prevention of Throat Infections in Ayurveda

Prevention is central to Ayurvedic philosophy. Below are some measures:

1. **Rasayana (Immunomodulation)** : Consuming immunity-boosting herbs like Ashwagandha, Guduchi, and Amalaki enhances resistance to infections.
2. **Hydration** : Drinking warm water throughout the day prevents dryness and irritation.
3. **Seasonal Adjustments** : Following seasonal regimens (*Ritucharya*) helps maintain dosha balance.
4. **Oral Hygiene** : Regular gargling and oil pulling reduce microbial load in the throat.

Modern Science Meets Ayurveda

Ayurvedic remedies are increasingly being validated by modern research. For example:

- Studies have confirmed the antimicrobial properties of turmeric, ginger, and Tulsi against pathogens causing throat infections.
- Practices like oil pulling have shown efficacy in reducing oral bacterial count.

Modern Scientific Validation of Ayurveda

Ayurvedic remedies are increasingly supported by scientific studies:

- **Turmeric** : Proven to possess antimicrobial and anti-inflammatory properties.
- **Tulsi** : Effective against respiratory pathogens.
- **Steam Inhalation** : Demonstrated to reduce mucus and improve breathing in respiratory conditions.

CONCLUSION

Throat infections, though common, can significantly impact quality of life if untreated. Ayurveda provides a time-tested, holistic approach to managing these ailments by addressing the root cause and promoting overall well-being. With the integration of dietary changes, herbal remedies, therapeutic practices, and preventive measures, Ayurveda offers a comprehensive framework for both treatment and prevention of throat infections. However, it is essential to consult a qualified Ayurvedic practitioner for personalized treatment, especially in severe cases. By combining traditional wisdom with modern understanding, Ayurvedic treatments can offer safe and effective solutions for throat health.

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POLYCYSTIC OVARIAN SYNDROME

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ABSTRACT

Polycystic Ovary Syndrome (PCOS) is a multifaceted endocrine disorder affecting individuals assigned female at birth, characterized by hormonal imbalances, ovulatory dysfunction, and the presence of polycystic ovaries. The condition is driven by an interplay of genetic, environmental, and lifestyle factors, leading to elevated levels of androgens (hyperandrogenism), insulin resistance, and inflammation. PCOS manifests through symptoms such as irregular menstrual cycles, hirsutism, acne, obesity, and infertility. It is closely associated with metabolic disturbances, increasing the risk of Type 2 diabetes, cardiovascular diseases, and mood disorders.

Recent research highlights the heterogeneity of PCOS, suggesting it comprises several distinct phenotypes with varying severity and presentations. These phenotypes can range from cases dominated by hyperandrogenism to those primarily exhibiting insulin resistance or menstrual irregularities. The complexity of PCOS pathophysiology suggests that a "one-size-fits-all" approach is ineffective, necessitating a personalized model of care to address individual symptoms and underlying mechanisms

Management of PCOS involves a combination of lifestyle interventions, pharmacological treatments such as hormonal contraceptives and insulin-sensitizing agents, and fertility treatments where necessary. The disorder also poses psychological challenges, with increased rates of anxiety, depression, and body image issues reported. Comprehensive, multidisciplinary care is essential for improving the overall well-being of those affected, emphasizing early diagnosis, patient education, and ongoing support.

REVIEW OF LITERATURE

- 1. L. Konrod's :** L. Konrod's literature review on endometriosis outlines key aspects of the condition, emphasizing its prevalence, biological processes, and management strategies. Endometriosis is characterized by the growth of endometrial-like tissue outside the uterus, affecting 6-10% of women. Symptoms typically include pain and infertility, and diagnosis is confirmed through laparoscopy and histological analysis. While mild cases are managed with medical treatments such as contraceptive steroids and anti-inflammatory drugs, surgery can offer relief, though symptoms often recur within two years. The review categorizes endometriosis into six stages of biological processes that resemble metastasis, including shedding of cells, survival, immune evasion, adhesion, angiogenesis, and bleeding. The role of transforming growth factor-beta (TGF- β) in these stages is highlighted, suggesting its involvement in both menstrual initiation and the careless regeneration of the endometrium post-menstruation. Increased expression of TGF- β during menstruation may indicate its pivotal role in these processes, providing potential targets for future research on endometriosis treatment.
- 2. Lars R. McNaughton :** Lars R. McNaughton is a leading figure in exercise physiology, focusing on areas like stretching, supplementation, and heat adaptation in athletic performance. His research reveals mixed results on static stretching, showing it may reduce stiffness but potentially impair explosive performance, with uncertain benefits for endurance athletes ResearchGate: He has extensively studied sodium bicarbonate as a performance enhancer, highlighting its role in buffering lactic acid during high-intensity exercise. Selected Works : Additionally, McNaughton's work on heat shock proteins explores how heat stress during exercise drives cellular adaptations, which is crucial for athletes training in extreme environments Selected Works:. His contributions provide valuable insights for optimizing sports training and recovery strategies.
- 3. Sardul S Guraya :** Both functions of the mammalian ovary, the endocrine and (synthesis and secretion of steroid hormones) and exocrine (production of ova), depend upon the presence and cyclic growth of follicles, as the depletion of primordial follicles from the ovary leads to cessation of these functions or female reproduction in mammals, or to postmenopausal period in humans. Actually, various fertility and sterility problems at the ovarian level are related to follicles. Therefore, a thorough understanding of the biology of ovarian follicles in mammals is of fundamental interest to a wide variety of academic and scientific disciplines. Study of their structure, function, and control involves morphology, including ultrastructure, cell biology, physiology, endocrinology, biochemistry, immunology, neurobiology and pharmacology. Zoologists take interest in comparative and evolutionary aspects of



biology of ovarian follicles in many different groups of mammals. Agricultural scientists and wildlife biologists need a thorough knowledge of the biology of follicles to control more effectively fecundity in domestic animals and endangered species of mammals

4. **Michael J. Buckenmeyer** : Michael J. Buckenmeyer's research in bioengineering focuses on innovative approaches for ovarian health, particularly in the context of fertility preservation. His work has pioneered the development of bioengineered ovarian-specific extracellular matrix (ECM) hydrogels, which serve as supportive scaffolds for follicle delivery. This technology has been instrumental in creating in situ ovarian environments, enabling sustainable follicle engraftment and natural pregnancy in preclinical models. These methods hold promise for addressing infertility caused by chemotherapy and other ovarian dysfunctions by integrating advanced biomaterials and regenerative medicine strategies

INTRODUCTION

Poly Cystic Ovarian Syndrome is a relatively common endocrine disorder in women of reproductive age group. It is found in around 70% of women who have ovulation difficulties leading to subfertility (1)

Poly Cystic Ovarian Syndrome is a condition that has cysts on the ovaries that prevent the ovaries from performing normally. (2) Symptoms of Poly Cystic Ovarian Syndrome include Amenorrhea or infrequent menstruation, irregular bleeding, infrequent or no ovulation, multiple immature follicles, increased levels of male hormones, male pattern baldness or thinning hair, excess facial and body hair growth, acne, oily skin or dandruff, dark colored patches of skin specially on neck, groin, underarms, chronic pelvic pain, increased weight or obesity, diabetes, lipid abnormalities and high blood pressure (3)

Fertility problems experienced by women with Poly Cystic Ovarian Syndrome may be related to the elevated hormone, insulin or glucose levels, all of which can interfere with implantation as well as development of the embryo (4). Increased Luteinizing hormone reduces the chance of conception and increase miscarriage. Additionally, abnormal insulin levels may also contribute to poor egg quality, making conception more difficult

The World Health Organization (WHO) stated that PCOS affected over 116 million women worldwide in 2012. One in five Indian women are affected by PCOS. Globally, 1.55 million incident cases of PCOS in women of reproductive age (15–49 years) were reported, representing an increase in the rate of 4.47% (2.86–6.37%) from 2007 to 2017. A large-scale survey conducted across India in 2020 showed that around 16% of female respondents between the ages of 20 and 29 years suffered from PCOS (5)

Herbal Drug

Currently, herbal remedies are playing a prominent role in treating various chronic disorders, including PCOS. The use of herbal medicines and modifications to the diet may help in treating PCOS more effectively. Different herbs will exert their activity against PCOS through a variety of mechanisms, including the suppression of prolactin levels, anti-androgenic activity, promoting follicle stimulating hormone (FSH), decreasing luteinizing hormone (LH), the induction of ovulation and restoration of glucose sensitivity, estrus cyclicity and enzyme activity

(Figure 3).

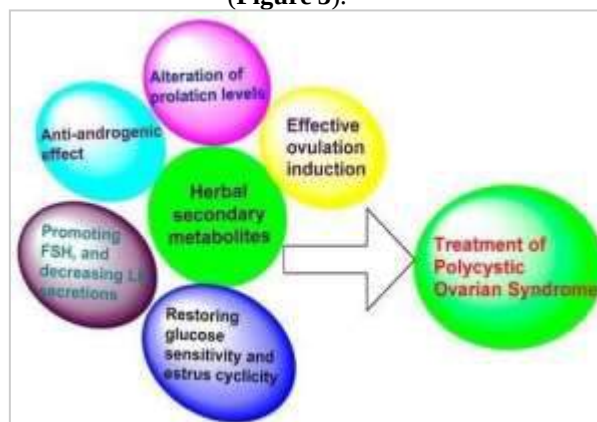


Figure 3. Mechanisms through which different herbal secondary metabolites are active in the treatment of PCOS.

Among various herbs, *Glycyrrhiza glabra* (liquorice), *Linum* (chaste berry), *Vitex negundo* (Chinese chaste tree), *Foeniculum vulgare* (fennel) and *Curcuma longa* (Turmeric) are potential plant sources that have shown effective action against PCOS (6).

3.1 Herbs That Increase Ovulatory Cycles

Changes in prolactin levels and hormonal imbalances will have a significant impact on ovulatory cycles. Decreasing prolactin levels or improving the hormonal balance have a positive impact on ovulatory cycles and the treatment of PCOS. These two activities have the potential to reduce cyst formation, dissolve cysts and improve ovulatory cycles. Vitex and turmeric are two herbs that show a beneficial effect in PCOS by increasing the ovulatory cycles (7).

3.2 Herbs with Anti-Androgen Properties

Elevated blood levels of androgens are also one of the major etiologies behind PCOS. Hence, drugs with anti-androgen activity are used in the treatment of PCOS. Herbs including *Glycyrrhiza glabra*, *Linum usitatissimum*, *Mentha spicata*, *Cocos nucifera* and *Punica granatum* have anti-androgenic action and these herbs could be useful for the management of PCOS (8).

3.3 Herbs That Restore Glucose Sensitivity, Estrus Cyclicity and Enzyme Activity

Decreasing insulin sensitivity and elevated blood glucose levels are also two of the major symptoms observed in women suffering from PCOS. As a result, drugs that increase insulin sensitivity are included in PCOS treatment. Herbs such as *Cinnamomum cassia* and *Aloe vera*, which have the same mechanism, can reduce blood glucose as well as regulate the estrus cycle and could be useful (9).

3.4 Herbs That Promote FSH and Decrease LH Secretions

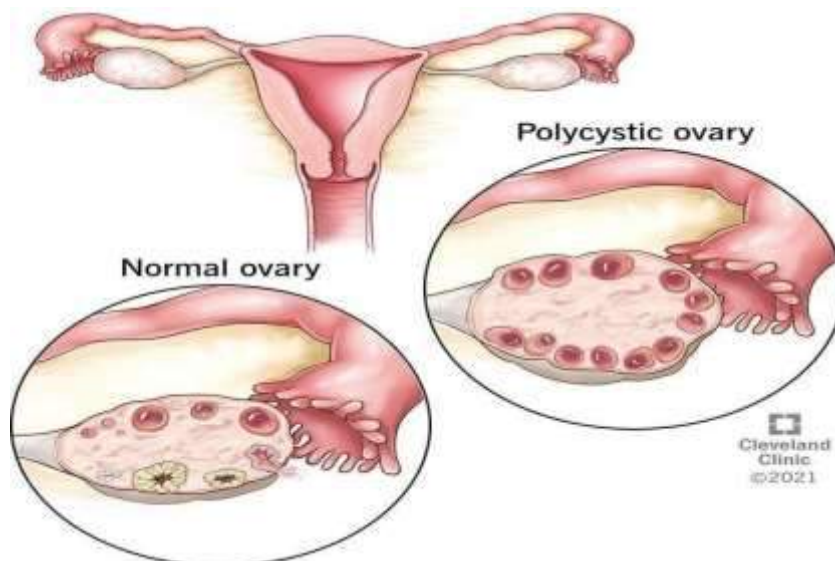
In PCOS, a common complication is elevated levels of LH and decreased levels of FSH. Hence, drugs that have the ability to elevate the levels of FSH and reduce the concentrations of LH are beneficial in the treatment of PCOS. Herbs including *Foeniculum vulgare*, *Panax ginseng* and *Cimicifuga racemosa* have such actions; hence, they are useful for the treatment of PCOS (10).

3.5 Effective Ovulation Induction Agent

The most common complication of PCOS is infertility or frequent pregnancy termination due to the patient's lack of carrying capacity. As a result, drugs used to stimulate ovulation are included in PCOS treatment. Herbs such as *Zingiber officinalis* and *Tribulus terrestris*, which have the same action and promote ovulation, might be useful for the treatment of PC (11).

Etiology

Differentiation between normal and polycystic ovary





- External Factors
 1. Epigenetic mechanism
 2. Environmental toxicants
 3. Physical and emotional stress
 4. Diet
- Insulin resistance
 1. Hyperandrogenism
 2. Oxidative stress
 3. Obesity

External Factors

1. Epigenetic Mechanism

Epigenetic refers to inheritable alterations in genome and gene expression without any changes in DNA sequence. These changes involve adding or omitting chemical components on DNA or histone. Increased LH activity is a seen phenomenon in PCOS women. It may relate to the problems in follicle development and HA, which are common among PCOS patients. LH/choriogonadotropin receptor (LHCGR) is responsible for the steroidogenesis process in theca cells. This receptor hypomethylation leads to higher gene expression and sensitivity to LH. [A study on PCOS patients approved that hypomethylated sites are related to overexpression of LHCGR in theca cells surface. In addition, epoxide hydrolase 1 (EPHX1) is an active enzyme in degrading aromatic compounds. Its gene promoter hypomethylation increases enzyme. Overproduction of EPHX1 reduces the transformation of testosterone to estradiol, which can contribute to PCOS [12]. Furthermore, peroxisome proliferator-activated receptor gamma (PPAR- γ) plays a role in ovaries' function. Hypermethylation of PPAR γ , hypomethylation of nuclear co-repressor and alteration in acetylation of histone deacetylase 3, for which both are PPAR γ co-repressors are observed in PCOS patients showing HA. These alterations were noticed in PCOS women's granulosa cells [13].

2. Environmental Toxicants

The United States Environmental Protection Agency (USEPA) defines endocrine-disrupting chemical (EDC) as "an exogenous agent that interferes with the synthesis, secretion, transport, binding, action, or elimination of natural hormones in the body that are responsible for the maintenance of homeostasis, reproduction, development and/or behavior" [14].

EDCs may act as hormones' agonists or antagonists in binding to their receptors. EDCs are almost parts of everything we use in our daily life. Their structures consist of phenols or halogens like chlorine and bromine, so they imitate steroid hormones' actions. Studies have approved the higher serum concentration of EDCs in PCOS suffering women. Prolonged and continuous exposure to EDCs from prenatal to adolescence can cause susceptibility to PCOS. As an example, bisphenol A (BPA). BPA is a synthetic compound used in polycarbonate plastics, epoxy resins, dental filling, food and drink packages, baby bottles, and polyvinyl chloride (PVC) which affects metabolism through different pathways. BPA directly affects oogenesis by interacting with estrogen receptor (ER) α and β , non-classical membrane ER, and G-protein coupled receptor 30 (GPCR30). It also triggers androgen secretion and restrains testosterone catabolism in theca cells [15].

Another effect of BPA on interstitial theca cells is the overproduction of androgens by dysregulation of 17 β -hydroxylase (P450c17), cholesterol side-chain cleavage enzyme (P450scc), and steroidogenic acute regulatory protein. BPA's influence on granulosa cells refers to reducing the expression of aromatase enzyme and production of estrogen.

Lastly, it disturbs the intrafollicular environment and damages the oocyte development and maturation. BPA's indirect effect on HA involves downregulation of testosterone 2 α -hydroxylase and testosterone 6 β -hydroxylase enzymes in liver level, and thus a higher concentration of testosterone [16].

In addition, BPA is a potent ligand for sex hormone-binding globulin (SHBG) and replaces testosterone; thereby, free testosterone concentration increases. Androgen and BPA have a two-way relation; high androgen inactivates the uridine diphosphate-glucuronosyl transferase enzyme and reduces BPA clearance in the liver. This process causes a high concentration of free BPA in blood and worsens its negative effects on the ovaries. Additionally, it is believed that BPA may act as an obesogen. Its obesogenic influence includes upregulation of adipogenesis-related genes, stimulation of adipocytes differentiation, potentiation of the accumulation of lipid in cells incorporated in medical syndrome, and triggering the conversion of target cells to adipocytes via phosphatidylinositol 3-kinase pathway [17].



Adipogenesis due to BPA happens because of the activation of the glucocorticoid receptor. Activation of the receptor upregulates the enzyme involved in the conversion of cortisone to cortisol, thus inducing. Moreover, BPA prompts the release of interleukin-6 (IL-6) and tumor necrosis factor α (TNF- α), both involving adiposity and IR. In addition, it restrains the release of adiponectin and the beneficial compound in protecting against IR [18].

It can also change glucose homeostasis by directly influencing the pancreatic β -cells. BPA causes a chronic increase in insulin and further IR in long by affecting the mitochondrial activity and metabolic pathways of β -pancreatic cells. BPA reduces glucagon secretion by inhibiting the intracellular calcium ion fluctuating pattern with a lack of glucose condition [19].

Advanced glycation end products (AGEs), also called gliotoxins, are another chemical group affecting body health. AGEs are pro-inflammatory molecules that interact with their surface receptor called RAGE (receptor for AGE) and stimulate pro-inflammatory pathways and oxidative stress. AGEs can be absorbed into the body as exogenous compounds or derived from nonenzymatic glycation and oxidation of proteins and lipids. Increased concentration of AGEs in serum has been detected in PCOS patients. AGEs interrupt pre-ovulatory follicles growth via ERK1/MAPK pathway and damage follicles by oxidative stress caused by interaction with. This interaction increases intracellular inflammatory molecules [20].

In vitro studies on 3T3-L1 cell lines showed that gliotoxins are likely to trigger adipogenesis. On the other hand, a higher body mass index corresponds to a lower extent of soluble RAGEs, which is responsible for gliotoxin clearance and deposition of AGEs in the reproductive system, especially in ovaries. This bilateral relation worsens inflammatory processes and metabolic syndrome in PCOS. AGEs also play a role in IR. These compounds disrupted glucose transport in the human granulosa KGN cell line and reduced glucose uptake by adipocytes in previous research. They also involve IR by causing oxidative stress, inflammation, and glycation of proteins, which considerably diminishes insulin sensitivity. Moreover, increased concentration of AGEs changes the insulin signaling pathway and interferes with glucose transporter 4 (GLUT-4) translocation [21].

3. Physical and Emotional Stress

Although there is minimal information on the role of stress in PCOS, it is known that PCOS possesses adverse effects on self-esteem and mental health. Chronic stress results in hypertrophy and hyperplasia of adipocytes. This phenomenon happens as a result of glucocorticoids' effect on pre-adipocytes maturation. Chronic stress is also associated with adipokine secretion, attraction, and activation of stromal fat immune cells. In addition, it is responsible for making an inflammatory condition by leading to high levels of inflammatory cytokines like IL-6 and TNF- α , along with disrupting oxidant-antioxidant balance. In addition, chronic stress plays a vital role in IR. Stress triggers the hypothalamic-pituitary-adrenal (HPA) axis to release cortisol. Cortisol leads to IR by stimulating visceral fat accumulation, gluconeogenesis, and lipolysis. Moreover, cortisol arouses glucose production in the. Stress is also involved in enhancing insulin levels. Other stress influences on PCOS may refer to interference with anti-müllerian hormone (AMH) and changing sex hormone levels [22].

4. Diet

Although nutrition contributions to PCOS is unclear, studies showed a relationship between some nutrient levels and PCOS indices. Saturated fatty acids (SFAs) intake plays a role in PCOS by producing an inflammatory status and reducing insulin sensitivity. Taking SFAs induces inflammation by triggering an increase in TNF- α level in circulation and expressing a specific cytokine suppressor. Vitamin D deficiency may exacerbate PCOS or the comorbidities induced by PCOS. Calcitriol upregulates insulin receptors at mRNA and protein levels. It also increases insulin sensitivity directly and indirectly. The direct effect occurs by activating PPAR- δ , the involved receptor in fatty acids metabolism in adipose tissue and skeletal muscle. The indirect impact is the regulation of intracellular calcium, which is vital for insulin-mediated signaling in fat and muscle. On the other hand, vitamin D deficiency may result in insulin resistance by causing an inflammatory response. Furthermore, vitamin D downregulates the AMH promoter [23].



Internal Factors

1. Insulin Resistance

IR means an insufficient cells response to insulin. IR is independent of patients' adiposity, body fat topography, and androgen levels i.e., it has been reported in lean patients as well. It should be mentioned that IR is tissue-selective in PCOS women although skeletal muscles, adipose tissue, and liver lose their sensitivity to insulin, adrenal glands and ovaries remain sensitive. Insulin directly triggers androgens production in ovarian theca cells and grows. Insulin effectively stimulates ovarian follicle growth and hormone secretion by stimulating its receptors in the follicle membrane. It also triggers ovarian P450c17 and P450scc enzyme



activity to promote ovarian steroidogenesis and increases them with the synergistic effect of chorionic gonadotropin. This hormone, as well as insulin-like growth factor 1 (IGF-1) [18], synergizes with luteinizing hormone [18,45]. Hyperinsulinemia increases LH-binding sites and androgen-producing response to LH [44]. LH and insulin interaction enhance steroidogenic acute regulatory enzyme and CYP450c17 mRNA expression. CYP450c17 is involved in androgen production. Likewise, IR independently enhances CYP17A1 activity, the productive enzyme in androstenedione and testosterone production [24]. On the other hand, hyperinsulinemia reduces hepatic SHBG, increasing free testosterone levels in blood. In addition, hyperinsulinemia inhibits IGF-1 binding protein production in the liver. IGF-1 is responsible for triggering the production of androgens in thecal cells. Inhibition of the production of IGF-1 binding proteins leads to a higher concentration of this substance in blood circulation and then higher production of androgens in thecal cells. Moreover, IGF-1 upregulation decreases a specific miRNA and thus accelerates granulosa cells apoptosis and inhibits folliculogenesis. HA and hyperinsulinemia both play a role in stopping follicles growth. This stoppage is attributed to menstrual irregularity, anovulatory sub-fertility, and amassing of immature follicles. Furthermore, hyperinsulinemia contributes to PCOS by affecting the pituitary gland. Excessive insulin stimulates its receptors in the pituitary gland to release LH. Accumulation of insulin stimulates GnRH and LH pulse secretion via influencing both amplitude and frequency. Insulin's indirect effect on PCOS is augmented by pituitary gonadotropin sensitivity to GnRH and hyperinsulinemia increases GnRH neuron activity. The insulin's influence on adipose tissue and inflammation is another essential PCOS pathogenesis topic. Insulin stimulates adipogenesis and lipogenesis and inhibits lipolysis, resulting in fat accumulation. IR leads to enhanced plasma levels of free fatty acids (FFAs), affecting the liver and adipose tissue. Moreover, IR causes a reduction in omentin level independent of the patient's body mass index (BMI). In addition, hyperglycemia can lead to inflammation by producing TNF- α from mononuclear cells (MNCs) [23].

2. Hyperandrogenism

Generally, hyperandrogenism (HA) reduces the SHBG level, leading to a higher concentration of free testosterone. It was observed that PCOS women have higher concentrations of testosterone in plasma, which can convert to estrone in adipose tissue. Increased alteration of estrone to estradiol affects follicle growth and increases the LH to FSH ratio, causing ovulatory dysfunction. HA can result in AMH upregulation, which inhibits ovulation and the development of follicles by a different mechanism. Furthermore, the IGF-II level is negatively related to androgen levels, and HA reduces IGF-II in follicular fluid. IGF-II positively relates to follicle diameters and estradiol concentration in follicular fluid. In addition, HA increases LH indirectly. Estradiol and progesterone are responsible for GnRH and LH secretion via negative feedback. HA disrupts the negative feedback on secretion, resulting in increased LH levels. Interaction of androgen and its receptor interferes with progesterone receptor transcription. Moreover, this receptor is involved in converting high levels of androgens to compounds that modulate the gamma-aminobutyric acid A (GABAA). Modulation of the GABAA receptor triggers GnRH neurons and weakens the response to negative progesterone feedback [58]. In addition, it is assumed that androgens might decrease hepatic nuclear factor-4 α (HNF-4 α) levels by inhibiting lipid synthesis. HNF-4 α stimulates SHBG expression by binding to its promoter [24].

HA contributes to other influential factors of PCOS, including IR, inflammation, and oxidative stress. HA aggravates IR via different routes; it reduces the insulin sensitivity, expression of GLUT-4 and inhibits insulin degradation in the liver. Moreover, HA increases a type of skeletal muscle fibers that have low insulin. On the other hand, HA worsens central adiposity, which is involved in. Additionally, it was observed that testosterone increases inflammatory chemicals such as lipopolysaccharide-induced IL-6 in 3T3-L1 adipocytes by activating some signaling pathways [64]. One way androgen results in oxidative stress is by increasing MNC sensitivity to glucose and aggravating glucose-stimulated oxidative stress. It is worth mentioning that dehydroepiandrosterone as an androgen decreases interferon- γ (IFN- γ), an essential regulator in normal ovarian physiology and cell function. In addition, it should be mentioned that studies on PCOS women approved the resemblance of their fatty tissue to men, and hence the effect of HA on adipose tissue dysfunction. In addition, HA is a cause of adipocyte hypertrophy and consequential damages to adipokine secretion [25].

3. Inflammation

Appropriate inflammation is a vital cause of oocyte growth and ovulation. However, high levels of white blood cell C-reactive protein (CRP) and other inflammatory biomarkers in peripheral blood are associated with PCOS.

Inflammation is a cause of HA. TNF- α is a pro-inflammatory chemical that can worsen IR. Contribution to IR happens due to interference of pro-inflammatory molecules with insulin signaling pathways and reduction of GLUT-4 expression. Some studies showed that the insulin receptor substrate (IRS) serine residue phosphorylation inhibits insulin receptor signaling. This phenomenon results in the prevention of GLUT-4 translocation and glucose uptake. In addition, TNF- α showed the ability to prompt theca cells proliferation in vitro. Furthermore, IL-1 hinders the FSH and LH receptors. Inhibition of these receptors leads to inhibition of follicular development.



and ovulation Both $\text{TNF-}\alpha$ and $\text{IL-1}\beta$ inhibit activation of $\text{HNF-4}\alpha$ by different mechanisms. In addition, NLRP3 inflammasomes induce follicular pyroptosis, ovarian fibrosis, and disturbance of follicular formation An increase in CRP level is another cause of IR in insulin-

sensitive tissues. IR occurs because of increased pro-inflammatory factors secreted by the liver and monocytes. CRP stimulates this increase in secretion Moreover, another study approved the higher- than-normal level of IL-6 mRNA in granulosa cells (26)

4. Oxidative Stress

Oxidative stress (OS) is an imbalance between pro-oxidants and antioxidants Oxidative molecules include different chemicals such as reactive oxygen species (ROS) (e.g., O_2^- , H_2O_2 , and OH^-) and reactive nitrogen species (RNS) ROS plays a role in different mechanisms like signaling pathways cell growth and differentiation, as well as RNS RONS also acts on ovaries functions like steroidogenesis and affects neurons responsible for feeding behavior to induce hunger Overproductions of oxidative chemicals cause various damage to vital molecules such as lipids, proteins, and DNA Increased OS has been seen in PCOS patients in different studies Increased levels of OS activate the nuclear factor-kappa B ($\text{NF-}\kappa\text{B}$) $\text{NF-}\kappa\text{B}$ is involved in inflammatory pathways and affects the production of pro-inflammatory cytokines like $\text{TNF-}\alpha$ and IL-6 the effect in IR and PCOS was explained above. A high level of OS also increases the release of $\text{TNF-}\alpha$ On the other hand, increased OS activates some protein kinases that trigger serine/threonine phosphorylation instead of normal tyrosine phosphorylation of IRS. Thus, the insulin signaling pathway is inhibited, and OS leads to IR OS also plays a role in obesity. It increases mature adipocyte size and consequently stimulates pre- adipocyte proliferation and adipocyte differentiation. OS also imposes a major effect on obesity (27)

5. Obesity

Obesity is a key in low-grade chronic inflammation Accumulation of adipocytes in visceral fat leads to hypoxia and consequent necrosis, which causes inflammatory cytokine production [66]. Adipocyte death due to hypertrophy causes an inflammatory state The mononuclear cells of adipose tissue produce pro- inflammatory cytokines Excess abdominal fat is also responsible for the inflammatory condition Obesity also plays a role in hyperinsulinemia, IR, and HA occurrence. Visceral obesity arouses an increase in non-esterified fatty acids (NEFAs) levels in the blood. Skeletal muscles uptake NEFAs as the energy source instead of glucose. This hyperglycemia leads to a pancreas rapid reaction and hyperinsulinemia In addition, the lipolytic response of visceral fat to catecholamines causes lipotoxicity and impairment of insulin clearance and activity FFA stimulates IRS-1 serine/threonine phosphorylation and reduces tyrosine phosphorylation. Increased FFAs reduce insulin and glucose uptake sensitivity in intramyocellular lipids Notably, that visceral fat is weightier in IR than abdominal and subcutaneous fat as the visceral fat lipolytic response to catecholamines is more severe The reason is the increased function of the β_3 and higher expression of β_1 and β_2 receptors Moreover, the type 1 isoenzyme of 11β -hydroxysteroid dehydrogenase (11β -HSD) is involved in converting cortisone to active cortisol, which is highly expressed in adipose tissue, especially in adipose tissue visceral ones. Glucocorticoids reduce glucose uptake and insulin signaling in omental adipocytes In addition, visceral fat's adiponectin secretion is less than subcutaneous fats, and this phenomenon leads to decreased adiponectin secretion in obesity .In addition to all adipose tissue's functions mentioned above, this tissue has endocrine function and secretes chemicals called adipokines or adipocytokines. Adipocytes produce leptin, a high concentration of which inhibits the expression of aromatase mRNA in granulosa cells—thus interrupting androgens to estrogen In addition, it is suggested that increased leptin levels are related to the absence of folliculogenesis Moreover, adiponectin, secreted by adipocytes has insulin-sensitizing, anti-diabetic, and anti-inflammatory effects The adiponectin insulin-sensitizing effect causes a reduction in FFA uptake and gluconeogenesis. It also plays a role in progesterone and estrogen production, ovulation, and decreased GnRH secretion Furthermore, adiponectin reduces LH secretion from the pituitary, triggers estradiol secretion in granulosa, and is associated with androgen production in ovaries Omentin-1, another adipose tissue secreted chemical, improves IGF-1-induced progesterone and estradiol secretion in different ways, including increasing the steroidogenic acute regulatory protein and CYP450 aromatase expression and enhancing IGF-1 receptor signaling Adipose tissue also has several enzymes responsible for converting androstenedione to testosterone and testosterone to dihydrotestosterone 17β -HSD converts androstenedione to testosterone and estrone to estradiol This enzyme is expressed in adipose tissue As a result of this process, excess adiposity exacerbates HA Furthermore, the accumulation of lipid in non-adipose tissues, called lipotoxicity, causes oxidative/endoplasmic reticulum stress linked with inflammation and IR. Excess fatty acids in muscles and liver induce IR via serine phosphorylation of insulin receptor by diacylglycerol In addition, lipid accumulation in the liver diminishes $\text{HNF-4}\alpha$ levels leading to reduced SHBG production (28)

Symptoms

1. Acne vulgaris

Patients with PCOS complain of inflammatory acne minimally responsive to conventional line of treatment. Even if responsive,



lesions promptly recur on stopping treatment, necessitating treatment with oral isotretinoin and/or hormonal therapy. An important feature seen in these patients is the development of multiple closed comedones which rapidly transform into tender, lumpy nodules, distributed in the lower half of face and jaw-line (V distribution). These tend to persist beyond the usual course of 5-7 days. A pre-menstrual flare is also common. Acne lesions may not only be localized to the face, but may also be present on the chest, shoulders and back. Prompt relapse after stopping the treatment, strongly suggests a hormonal basis.

Patients may in addition, have a history of irregular periods, and evidence of hirsutism, alopecia, or a positive family history of PCOS. The severity of hirsutism may not be matching the severity of acne, and would be dependent on the balance of activity between the androgenic type 2 vis-à-vis type 1.



2. Hirsutism



Excessive facial hair is a racial trait for the Indian sub-continent, running within families and especially strong in certain ethnic groups. This should be kept in mind while evaluating patients complaining of excessive facial/body hair. Androgens affect various aspects of follicular activity. Acting via androgen receptors and secretory factors, they increase the growth rate, diameter and melanization of hair in androgen-sensitive areas. It is this thick, coarse, terminal hair, in androgen-dependent areas which are unsightly on a female and point to an underlying hyper-androgenic state. Evaluation of the degree of hirsutism is done by adopting a modified Ferriman-Galway score.



which evaluates 9 body areas on a scale of 1 to 4. The total scores are significant if more than 6 to 8. (29)

3. Alopecia

Not all cases of female pattern hair loss (FPHL) may be of androgenic origin. Patterned hair loss in PCOS may be difficult to distinguish from those secondary to other hyperandrogenic states [Figure - 5]. Various clinical presentations include those described by Ludwig (diffuse), Hamilton (male pattern), and Olsen (frontal accentuation). Women with early onset FPHL are much more likely to have an associated hyperandrogenism. Hormonal influences convert terminal to vellus hair, making the scalp appear bald.



4. Acanthosis Nigrans



Typically thick dark velvety skin situated on the nape of the neck, axillae, groins and other frictional areas may often be the first clue of insulin resistance [Figure - 6]. The thickening occurs due to the stimulation of tyrosine kinase growth factor - signaling pathways in the epidermis. Insulin - like growth factor receptor 1 (IGF1R) is present in many tissues including the epidermis and ovary. High levels of insulin directly or indirectly stimulate the IGF1R resulting in the skin changes. Skin tags in the frictional areas like the neck, axillae, groins, infra mammary or even under a pendulous abdominal fold are common, especially in obese individuals. (30)

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COMMUNITY POLICING: A MODERN POLICING APPROACH

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ABSTRACT

Due to the Increasing rate of crime in the community, the well established gap between the police officers and the general public is constantly increasing. As a result of it, the relationship between the police officials and public becomes very disgraceful. There is a need for cooperative relationship between them in order to function well by the police officials and to establish a secure community. The trust of the public is declining towards the police officials with the interval of time due to their mal behaviour. That is why the policy makers are continuously promoting the idea of Community Policing among the police officers. Police makers emphasize on the implementation of Community policing by the law enforcement agencies. So that they can regain the trust and confidence of the general public and they can perform their duty in a smooth manner with the assistance of the local residents of a society. Excessive use of physical force by the police officers towards members of the public has widen the gap between them. As a result of it, there is a huge sense of disbelief towards the police officials among the members of the community. So it is urged that the police officials should reinvigorate their planning while enforcing laws in the community. Another important aspect of Community policing is that it is a "Problem Oriented Policing" approach in which the design of crime is strictly analysed by the police officers. After detecting the pattern of crime, the policemen come up with different strategies in order to successfully counter these issues of crime and disorder. Primarily, the Community Policing aims on the detection and prevention of street or neighbourhood crimes and disorders and it also provides for improved planning for countering the local issues of the public.

KEYWORDS – Policing, Social disorder, Law enforcement, Beat Officers, Decentralization.

1. INTRODUCTION

Community policing is a modern day philosophy which primarily aims at the promotion of organizational planning within the Police Department. Community policing provides for a number of rules and regulations with the help of which the present day situation of crime can be reduced to a great extent. Community policing supports the utilization of cooperative Connections between the police officials and the members of the community. Community policing focuses on eliminating such opportunities that give rise to the various issues related to crime and disorder, issues related with public safety & security and the local issues of the community. Community policing aims at to address the root causes behind the commission of a crime so that the further crime can be stopped before their occurrence. Community policing does not only provide for detection of crime, responding quickly to a crime, solving a crime but it also provides for eliminating the fear of crime from the minds of local inhabitants of a community. Community policing widen the power of police officers so that they can work without any pressure from the top and can assist in making a society a better place to reside and work. Community policing enhances the number of functions assigned to the police officers as compared to the traditional form of policing. Community policing focuses on transformation within the police department that emphasize on Community policing. Community policing also provides for developing a bold cooperation between the police officers and the local residents of the community. Community policing is a practice that deals with the notion that the police-public interactions can prove to be a very important step towards the detection and prevention of crime. It plays a crucial role in accomplishing the objectives of Community policing. Police officers should modify their strategies in relation to the Community Policing so that they can get the favourable results out of it. Community policing can prove to be a important strategy in the direction of developing strong bonding between the police and general public. Community Policing also assist in eliminating the fear of crime from the minds of people. The strong bonding between the police and public is the main basis for the decrease in Crime statistics in community. Community policing can assist in tackling the common issues and challenges faced by the police officers and members of the community by developing a healthy relationship between them. Community policing increases the interaction between the police and public so that they can work in the direction of combatting the issues related with crime and disorder. Community policing can prove to be the most effective tool for the overall development of a community¹.

2. MEANING AND DEFINITIONS OF COMMUNITY POLICING

¹ Community Policing: Comparative Aspects of Community Oriented Police Work, India, available at: <https://www.ojp.gov/ncjrs/virtual-library/abstracts/community-policing-comparative-aspects-community-oriented-police> (last visited on November 21, 2024)



Community policing is also known as community-oriented policing. Community policing is the law enforcement philosophy in the contemporary world. The actual meaning of Community policing is the association between the police officers and members of a community. Both the police and public are engaged in solving the problems of a specific area of a community. For example, Residential Welfare Association has been established in the various localities. These associations work as the representative of the people residing in that residential area. These associations are engaged with the police officers in order to sort out the local issues of the community. These associations work as a bridge between the community members and high rank police officers. Community policing needs the police officers to engage themselves with the local residents of a community so that they can work for their mutual benefit. Under the concept of Community policing, the police officers are trained to detect the crime, prevent the crime, solve the crime, find out the root causes behind the crime instead of just responding to the crime after its occurrence. Community policing here would be when the residential welfare association is supported by the police officers in the problem solving. Community policing has very broader application, it consists a variety of operations such as detection of crime, prevention of crime and finding the main causes behind the crime etc. Community policing also emphasizes on making the local inhabitants of community, active participants in the services of police. Moreover, if the patrolling in neighbourhood is supported by the Beat officers of that area, it would result into effective problem solving and crime prevention. Community policing focuses on creating good partnership between the local residents of community and police officials, within which both will work together to solve the problems of the community².

Community policing stress upon developing strong connections of policemen with the general public. Community policing provides for a variety of strategies that emphasize on increasing the level of interaction or communication between the police and the public. Enhanced interaction between the police officers and members of community will boost up their trust and confidence in each other. As a result of it, the increasing crime statistics can be reduced to a significant extent. The main aim of Community policing is to establish good relationship between the members of the community and the police officials in order to diminish the social chaos³. Community policing is an intelligence-led policing which provides for various plan of actions to detect and prevent crimes, solve crimes and to maintain peace and order in the community. Police officers are not solely responsible for maintaining tranquillity in the community, they require the full cooperation of members of the community. Community policing can prove to be an effective method of policing with the help of which the trust of the public can be enhanced towards the police officers and the police legitimacy can be increased towards the general public. Community policing aims on the crime prevention strategies, enhanced visibility of the operations of Police officers, decentralization of police powers so that the requirements of the community members can be fulfilled, enhancing the cooperative relationship between the police officials and the local inhabitants of the community. Community policing seeks to maintain the high standard of life among the members of the community. Community policing stresses upon to develop a cooperative partnership between the police officers and general public so that they can address and solve the various issues that disturbed both the Police department and the members of the public. Community policing replaces the traditional form of policing by providing equivalent significance on the detection of crime, prevention of crime and maintaining law and order in the community. Community policing provides that the members of the general public should come forward as active partners of police officers and they should voluntarily associate themselves with the police officers in the decision-making process. Comprehensively, the emphasis is given on creating strong bonding between the policemen and local residents of the community. It enables the police officers to quickly detect, evaluate and respond to the local issues of the community members in a methodical manner. By working together as active associate or ally of each other, the police officers and the public can stop the increasing figures of crime.

2.1. Definitions Of Community Policing

According to “Bertus Ferreira” - *“Community policing is a philosophy of full service personalized policing, where the same officer patrols and works in the same area on a permanent basis, from a decentralized place, working in a proactive partnership with citizens to identify and solve problems.”*⁴

According to “Punjab Police Website” - *“Community Policing focuses on the Police being proactive in delivering the services and having increased interface of the Police with community. It is true example of police public partnership where citizens have been empowered with the help of the police. Thus community policing is an effective answer to a complex situation.”*⁵

According to “John Riley” - *“John Riley was a professor in Justice Centre explains Community policing, “As a philosophy of policing that requires police officers to act with increased levels of autonomy and professional discretion to solve problems and to develop partnerships with the community. It is true that community policing also involves delegation to the field level*

² Community Policing, India, available at: https://en.m.wikipedia.org/wiki/Community_policing (last visited on November 21, 2024)

³ Chaos means, “a state of utter confusion or disorder; a total lack of organization or order.”

⁴ Community Policing: A Contemporary Perspective, India, available at:

https://www.researchgate.net/publication/273448903_Community_Policing_A_Contemporary_Perspective (last visited on November 21, 2024)

⁵ Definition of Community Policing, India, available at: <http://punjabpolice.gov.in/CommunityPolicing.aspx> (last visited on November 21, 2024)



officers who take on the spot decisions thus decentralizing policing. It also encourages officers to respond fast and in a transparent manner as they are held accountable by the local community. Therefore logically delegation, decentralization, quick response, transparency and participation become essential ingredients of community policing. And all these are hallmarks⁶ of good policing.”

According to “Koch” and “Bennet” – Koch and Bennet analyze the definition of Community Policing in 1993 as, “A belief or intention held by the police that they should:

- Consult with and take account of the wishes of the public in determining and evaluating operational policing policy and practice; and
- Collaborate with the public whenever possible in solving local problems.”

According to “Chandigarh Police Website” - “Community policing focuses on crime and social disorder through the delivery of police service that include traditional law enforcement as well as prevention, problem solving, community involvement and partnership. The community policing model balances reactive responses with pro-active problem solving, centred on the causes of the crime and disorder. Community policing requires police and citizens to join together as partners in the endeavour to identify and effectively address various issues.”⁷

According to “Robert R. Friedmann” - Robert R. Friedmann defines the concept of Community Policing in 1992 as, “Community Policing became a 'buzz word' that is taken for granted by professionals and scholars who used the term to replace other terms such as foot patrol, crime prevention, problem-oriented policing, community-oriented policing, police-community relations and more.”⁸

According to “Stipak” - Stipak defines Community policing in the year 1994 as, “A management strategy which aims to promote joint responsibility of community members and police for the purpose of safety. In other words, community policing is about police – citizen partnership.”

According to “Andhra Pradesh Police Website” – Andhra Pradesh Police explains Community Policing as, “A Community policing as a Police-Public partnership programme. This programme orients the way that the police should think and act. It broadens the police mandate beyond the narrow focus of fighting crime to include efforts to fight fear of crime and disorder as well. Community Policing provides an organizational strategy that motivates police officers to solve community problems in new and innovative ways. It envisages that the police must closely work with the people in the community by allowing average citizens a say in the police process, in exchange for their support and participation.”

3. NEED FOR COMMUNITY POLICING

Traditional model of policing was proven to be redundant due to many flaws in this system. That is why the traditional model of policing cannot be continued in the contemporary world. Due to various flaws in this traditional policing system, need for a modern policing approach was felt. Policy makers come up with the idea of community policing as the replacement of traditional model of policing. Policy makers accepted the fact that there is a strict need for a innovative policing approach in order to combat the crimes and disorders in the community. The intensity and essence of crimes these days outcome in the requirement of a more proficient method to tackle this situation.⁹ That is why the Community policing has gained absolute momentum as the effective law enforcement practice in the last couple of years. The police officers and the representatives of the community have thus put forward a new and more productive method to make the community a safe and secure place and to enhance the overall standard of life in a community. The planning or approaches to Community policing may differ from place to place as per the population of a area, geography of area and the necessities of a particular community. That is why, Community policing is not controlled by any set of rules and regulations.

Moreover, There has been a lot of changes within the social pattern or structure of community. In this swiftly changing social environment, where the crime statistics are at it's peak, neighbourhood decay¹⁰ is increasing day by day, police officers are

⁶ Hallmark means, “a typical characteristic or feature of a person or thing.”

⁷ Community Policing: Definition, India, available at: <http://chandigarhpolice.gov.in/community-policing.htm> (last visited on November 21, 2024)

⁸ Robert R. Friedmann, *Community Policing: Comparative Perspective and Prospects 2* (Prentice-Hall, America, 1st edn., 1992).

⁹ Why do we need Community Policing, India, available at: <https://www.google.com/amp/s/blog.ipleaders.in/need-community-police/amp/> (last visited on November 21, 2024)

¹⁰ Decay means, “to become gradually damaged, worse, or less.”



occupied in dealing with high levels of violent acts, the idea of Community Policing can prove to be a perfect replacement for the traditional model of policing.

4. ATTRIBUTES OF COMMUNITY POLICING

Community policing is a modern day policing approach and it has various attributes. These are as follows:

4.1. Philosophical Attributes Of Community Policing

Community policing is the most imperative replacement for the traditional policing system. Community policing challenges the basic principles of traditional policing system. Traditional form of policing emphasizes on separation of the Police department from the local residents of the community. In traditional policing, the police officers had limited powers and they did not have much connection with the general public. Police officers were more confined to their professional work. Due to which there was a situation of estrangement between the police officers and the general public. In traditional form of policing, the behaviour of police officials towards the members of neighbourhood was not good at all. As a result of it, the necessity of a new policing approach was felt in the police department. When Community policing came into existence, then the role and functions of the police officers increased significantly. In contrast to traditional policing, Community policing treats the members of the general public as the co-producers of the services of the police. Community policing focuses on making the Police officers and members of a community, active partners of each other¹¹.

As per the idea of Community policing, the police officials and local residents of a community are equally responsible for diminishing the rate of crime and disorder in a community. They are jointly accountable for enhancing the overall quality of life in a society. According to this law enforcement philosophy of Community policing, the beat officers who are appointed at field level should come up with local residents of community to ingress into the process of decision and policy making. Community policing encouraged the local inhabitants of a community to voice their issues to the concerned police officer of their neighbourhood and it is the prime duty of the police officer to deliberately solve these issues within a reasonable time. Professionalism of police is very significant but they should not detach or aloof¹² themselves from the members of a community. Under the concept of Community policing, the beat officers are required to make connections with the members of general public in a friendly manner. Law enforcement and Crime prevention are the significant aspects of the policing but Community policing acknowledge that, in actuality, the police officers are more oriented towards the non-enforcement projects. These non-enforcement projects include maintaining peace and order in community, fulfilment of needs of members of a community and providing social services to the community. As a result of it, Community policing emphasizes on decreasing crime rate, problem solving and taking care of victims of crime along with making apprehensions.

4.2. Tactical Attributes of Community Policing

Community policing requires that the police officials have to ameliorate their bonding with the local residents of the community. Community policing directs the police officers to bring a change in their attitude towards the members of a community. Police officers have to make significant switch in their mal-behaviour towards the general public. The programs and activities that are linked with Community policing are focusing more and more on fostering a strong relationship between the police officers and members of the community. The sense of empathy and harmony between police and public in order to successfully implement Community policing. The following interrelated projects can help in enhancing the standard of communication between the police and public, increasing the capacity of police officers to participate in problem solving partnership by establishing a cooperative relationship with the members of the community¹³.

4.2.1. Relationship Between the Police Organization and The Community

In order to advance the relationship between the police department and communities, the police officers are required to first obtain the input from the members of a community. This plan of action can prove to be very significant in order to solve local issues of the community. A number of methods can be utilized in order to accomplish this plan of action such as by conducting home visits in the neighbourhood by the policemen, by conducting surveys, by organizing meetings with the representatives of different communities on a regular interval. These methods will ensure the free flow of information to the police officers from the members of a community and it will assist the police officers in detecting and solving the various issues of a community members. In order to prevent crime in the neighbourhood, the beat officers can encourage the members of a community to observe any dubious behaviour and report the same to the police officers. Any illegal or suspicious behaviour can easily recognized by this plan of action and it will be very effective in prevention of crime. On the other hand, the police officials can also educate the local inhabitants of a community on how to keep away from become the sufferer of a crime and if a crime is

¹¹ Police: Community Policing, India, available at: <https://law.jrank.org/pages/1648/Police-Community-Policing-Definition-community-policing.html> (last visited on November 21, 2024)

¹² Aloof means, "removed or distant either physically or emotionally; not friendly and not getting involved."

¹³ Id. at 8



about to happen to a person then how to deal with that situation.¹⁴ Police officials should encourage the members of the community to participate in crime prevention projects of police such as neighbourhood watch. More crucially, the advance coordination between the police officers and local residents of a community depends on the sense of trust and confidence between them. Despite the fact that, most of the decision making power is taken by the police officers, a persistent relationship between the police officials and members of a community can be established if the police officers start responding quickly to the needs of the community members and held themselves answerable to the members of a community for any action they take during their duty hours. Police officers should illustrate allegiance and answerability by making an assessment on how far they have pleased the concerns of general public and by giving members of a community with quick and constant updates regarding a specific case. Police officials can conduct surveys or they can make door-to-door visits in the community or they can conduct interviews over phones with local residents of a community to find out “Customer Satisfaction” with the standard of police services delivered to them. Feedback should be given via reports, bulletin, newspapers, circulars or by making community pronouncement.¹⁵

4.2.2. **Quality of Police-Public Interaction**

It is one of the foundation of Community policing is the effort to enhance the standard of communication between the policemen and local residents of a community. More and more police officers are required to be assigned in the hotspot area of crime to foot or car patrol in order to expedite personal connection between police and public. In order to civilize the cooperation between police personnel and public, the police officers are getting to know the local inhabitants of the community to which they are assigned. The task of patrolling played a significant role in providing a big opportunity to police officers to associate themselves with the members of the community in the maintenance of law and order. The visible presence of police officers in the neighbourhood makes general people feel more safe and secure. The presence of police officer eliminate the fear of crime and enhance rapport between the police and public. Ultimately, the police officer is responsible for the overall development of a community with the utter cooperation of public.

4.2.3. **Solving Engagement**

for conception that the police officers and the members of community should fraternize with each other in order to solve the local issues of the neighbourhood. This notion overs the criticism of Community policing that it is merely an practice for upgrading the relations between police and public. Actually, the Goldstein stated that the establishment of problem solving engagement between the police officers and community led to the departure of traditional form of policing. Rather than just responding to the issues of crime & disorder after their occurrence, the police officers are fortified to let the members of a community to detect the local issues of the community and to work with the police officers to discover the most effectual outcome. Community policing is considered as the innovative approach of policing in which the police officers are under the responsibility to trace out the main causes behind the crimes. It is the imperative duty of police officers to solve the issues of the community members within no time. Nevertheless, the law enforcement is considered as the most important process for the effective problem solving but the police officers should find out other techniques of social control as per the preference of community members. In a nutshell, problem solving does not merely depends upon the strong relationship between the police and public, but on the capability of police officers to identify the pattern or connections between occurrences and on the readiness of police officers to pick long term solutions over short term solutions.¹⁶

4.3 **Organizational Attributes of Community Policing**

The traditional model of policing consist of the reactive patrolling and incident based responses of police officers. That's why the Community policing shift away it's focus from these types of tactics and recommended some important changes within the police department. Under the traditional form of policing, the police organization was considered as the red tape institution due to the centralization of powers. In traditional policing, the structure of police department was fixed in the hierarchical order and the decision and policy making power vested with those who were at the high rank in the police department. The decisions taken by high rank officials then conveyed to the field officers in the form of rules and orders, and implemented by way of stiff sequence of command. Field officers were working under the direct control and supervision of high rank officials that is why the senior rank officers were accountable for the decisions made by field officers.¹⁷

¹⁴ *Characteristics of Community Policing, India*, available at: <https://www.ipl.org/essay/Characteristics-Of-Community-Policing-PC9HHJW3RU> (last visited on November 21, 2024)

¹⁵ *What is Community Policing, India*, available at: <https://www.discoverpolicing.org/explore-the-field/what-is-community-policing> (last visited on November 21, 2024)

¹⁶ Linda A. Miller, Karen Hess, et.al., *Community Policing: Partnership for Problem Solving* (Delmar Cengage Learning, Boston, 7th edn., 2013).

¹⁷ *Organizational transformation in Community Policing, India*, available at: <https://cops.usdoj.gov/organizationaltransformation> (last visited on November 21, 2024)



On the other hand, Community policing focuses on that the field officers are more acquainted and experienced amount the communities as compare to the high rank police officers. The police officers at field level are required to have more autonomy so that they can quickly response to the local problems of community and can participate in problem solving. The independence and freedom of field officers to quickly respond to the issues of community is fortified by the decentralization of the structure of police department. Community policing stress upon the establishment of Community substations in the different areas of community. Community policing directs the police department to provide field officers with all important resources in order to enhance the ability of police officers to solve problems and to make police department more flexible. Under the concept of Community policing, the field officers are encouraged to be ingenious in their efforts to find out the solution for different problems of street crimes, neighbourhood crimes. Community policing does not consider the department arrest, or citations as the sine qua non¹⁸ of police department, but it pay it's attention towards the maintenance of law and order and the social services. Without making significant changes in the structure of police department, it's administration style, and it's system of effectiveness and answerability, Community policing can't be implemented in the most suitable manner.

5. PROBLEM AREAS OF COMMUNITY POLICING

The need for community policing was felt among the policymakers due to the fact that members of the community do not have sense of respect or goodwill towards the Police department. The image of the police officers is getting substandard among the local residents of the community day by day. The relationship between the police and public is not compassionate or familiar at all. The actions of police officials towards the members of the community are often seemed of being perfidious¹⁹ in nature. The formation of Indian police was done during the Britishers rule. That is why it was contemplated as the agency of persecution which wanting to restrain the chauvinist movement. So there is a pressing need to change the mind-set of people towards the police officials.

Nowadays, There have been several problems in relation to the police officers. sometimes police officers have come under the inspection of members of the community with the aid of media. Cases of police brutality are being seen everyday. Sometimes it is observed that the policemen are not handling or investigating the cases properly. Incidents of police taking bribe have become very common these days. Members of the community have to make frequent rounds of police stations in order to register their F.I.R. Due to this situation, the members of the community has detached themselves from the police officials. There has been a sense of distrust between the police and public. So it is the need of the hour to implement Community Policing for curbing these concerns of the community.

6. METHODOLOGY

This research work explains the idea of community policing as a modern policing approach. The present research work is done by using relevant evidences and examined by other research as well. The research has been carried out with the help of legal postulations. Since the concept of community policing is proving to be very beneficial internationally, that's why an attempt has been made in this research work to identify various favourable outcomes it can have in India. The present study is non-doctrinal in nature and descriptive in approach. In doctrinal research method the researcher has relied on secondary sources such as books, articles and websites.

7. CONCLUSION

Community policing is an effective method of law enforcement in the contemporary world. Police and public act as the facilitators to implement community policing. But the mind-set of members of the community is very clear towards the police officers, they have a substandard profile of police officers in their mind. Due to which the police department is facing a lot of problems in implementing community policing. It becomes very complicated for the police officers to implement community policing without the cooperation from members of the community. So there is a pressing need for making crucial changes within the organizational structure of police department. By doing this, the police officers will be able to regain the trust and confidence of the local residents of a community.

A few steps that can be taken in order to make community policing a success are as follows:

- Attempts should be made to strengthen the bonding between police and public;
- Police officers should patrol in their area of assignment on a regular interval so that the members of the community can feel more comfortable in their presence;
- Police officers are needed to be more accessible to the general public so that the free flow of information can be assured from members of community;

¹⁸ Sine Qua Non means, "an essential condition; a thing that is absolutely necessary; the essential, crucial, or indispensable ingredient without which something would be impossible."

¹⁹ Perfidious means, "perfidious is someone or something that cannot be trusted or that is dishonest; deceitful and untrustworthy"



- The profile of police is considerably damaged by the interference of political parties corruption cases and other negative reports against them, therefore the recruitment of police officers should be done in a proper manner.

There are a number of instances where community policing proved to be ideal method for eliminating crime and disorder from the community and establishing good nexus between the police and public. Community policing has not only assist in creating a safe community but also has been able to strengthen the bonding between police and public. Therefore, it can be said that Community Policing is a advantageous practice towards the establishment of a safe and secure community.

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A REVIEW ON NUTRITIONAL PRODUCTS FROM MUSHROOM

Miss. Pooja Keskar, Dr. Anil V. Landage

ABSTRACT

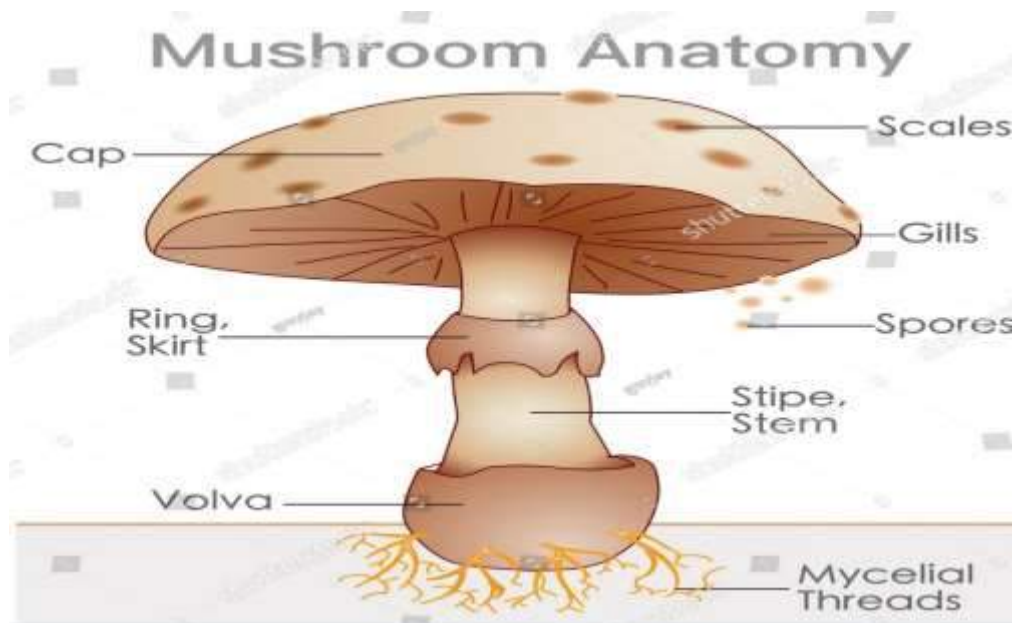
*In terms of size, nutritional value, and feelings of hunger and thirst both before and after an event, snacks differ from meals. When it comes to nutritional content, the snacks that are now on the market are high in fats and carbohydrates and low in dietary fiber and beneficial ingredients like antioxidants and polyphenols, which puts children and teenagers at serious risk for health problems. Since protein is one of the essential nutrients needed during the growing years and is deficient in snack meals, the current study aimed to create snack foods high in protein and fiber with mushrooms serving as the main ingredient. White button mushrooms (*Agaricus bisporus*), a spice blend, and additional ingredients were used to create two mushroom snack products: mushroom tikki and filled mushroom.[1] It is also possible to sell the mushroom snack as having "high fiber," "low sodium," and "source of protein." Additionally, this snack contained phenolic compounds, alpha-glucosidase inhibitory characteristics, and inhibitory properties for angiotensin-converting enzymes. The consumer acceptance test (n = 300) indicated that 64% of the individuals were interested in purchasing the product, with an acceptability level of 95%. The mushroom snack can also be marketed as having "low sodium," "high fiber," and "source of protein." This snack also had antioxidant properties, phenolic compounds, alpha-glucosidase inhibitory properties, and angiotensin-converting enzyme inhibitory properties. Approximately 64% of the individuals in the consumer acceptance test (n = 300) expressed interest in purchasing the product, indicating an acceptability level of 95%.[2]*

KEYWORDS:- mushroom, nutritional value, snacks, protein, enzyme, functional components, enzyme inhibition, product, antioxidant.

INTRODUCTION

Cow's milk can be replaced with edible mushrooms and other protein sources like almonds. The non-dairy pasta flour manufactured from nuts and mushrooms was used as a foundation for a variety of food products made from nuts and mushrooms, including peanut and mushroom yogurt and yogurt prepared with components combined with nuts and mushrooms. However, the pasta cooked with nuts and mushrooms was not as good as the spaghetti cooked with cow's milk and powdered milk. This is due to the protein in mushrooms and nuts lacks casein, an essential component of milk. Pasta flour made from nuts and mushrooms, according to Khusniati et al.[3] Numerous other health advantages of mushrooms have also been documented, including their antioxidative, antifungal, antiviral, anticancer, and hypocholesterolaemic qualities (Kim et al., 2014). According to Li et al. (2014) and Jiang et al. (2015), shiitake mushrooms are rich in nutrients and include a variety of bioactive substances, including polysaccharides, antioxidants, dietary fiber, ergosterol, minerals, vitamins B1, B2, and C, folates, and niacin. The purpose of this study was to assess the effects of substituting defatted soybean, wheat germ, mushroom, and Moringa oleifera leaf flours from grit corn-based mixes to four distinct snacks via extrusion, as opposed to congrits snack. Evaluations included chemical, sensory, and biological aspects[4]. The main reasons people eat mushrooms are for their flavor and texture. Because of their high protein, vitamin, and mineral content, low fat content (2–8%), and special biochemical makeup, mushrooms are a low-calorie food that is a good choice for those with diabetes, atherosclerosis, obesity, and hypertension. They have also recently gained popularity as a healthy food source and as a source for pharmacological development (Singh, 2017). There is a wide utilization of mushroom from its traditional uses to medical ones (Aida et al., 2009). Around the world, there are numerous varieties of mushroom farms, and each has pros and cons. Mushrooms are a type of fungus that feeds on stems or the soil. The mushrooms that are available in our country include shiitake, oyster, button, cucumber, golden cauliflower, and more. There are two types of oyster mushrooms:

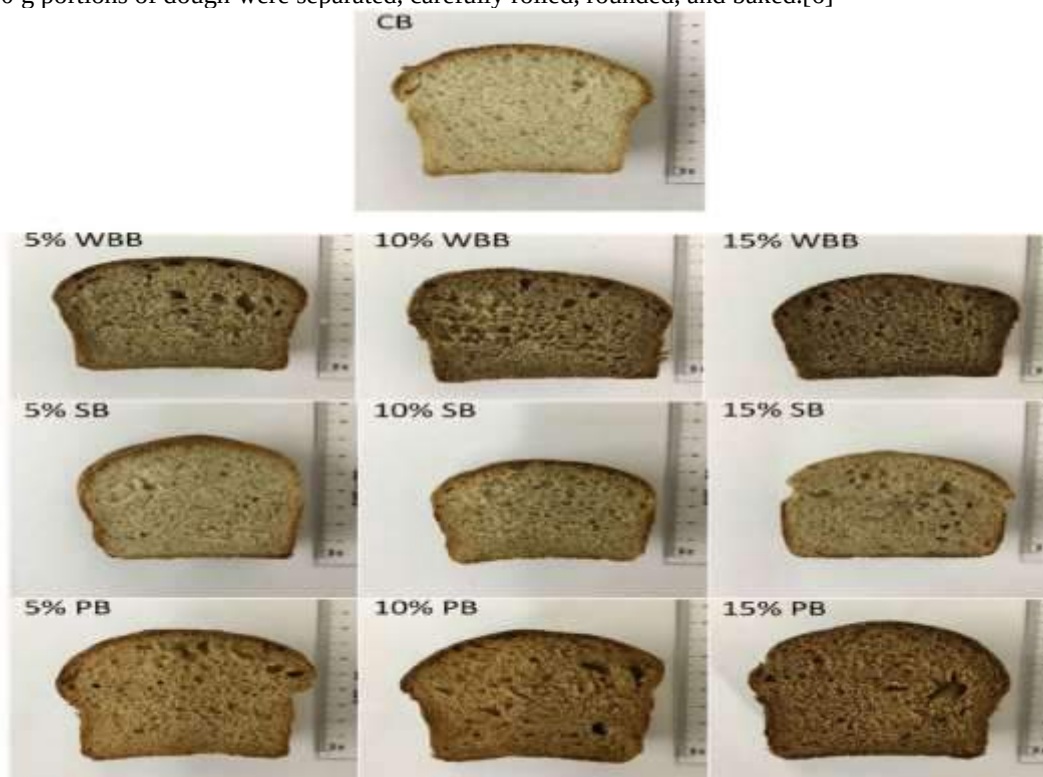
Pleurotus Florida, or white oyster mushrooms, and Pleurotus Pulmonarius, or gray oyster mushrooms. Because oyster mushrooms can benefit those who consume them, their selection is ideal for inventing a frozen product. Products like oyster mushroom nuggets can benefit a lot of customers. In addition to offering a range of nutrients, frozen oyster mushroom nugget products are ideal for kids since they may consume nuggets created. A mushroom's good savory flavor and bite-size texture make it a popular dish. The caps of the mushrooms are thin and broad, resembling fans or oysters, and they have gills on the underside. The mushrooms are typically white, grey, or brown in color. Indeed, due to their bioactive makeup, mushrooms get a lot of interest from academics studying food and medicine. The biomolecules present in mushrooms, such as polysaccharides, steroids, resin structures, and phenolic chemicals, exhibit a range of biological functions[5].

**Fig.1**

METHODS OF PREPARATION

1. Bread preparation

Powdered mushrooms were made using the technique described by [10]. The straight dough method was used to make the bread samples (AACC, 2000). 500 g of wheat flour, 30 g of granulated sugar, 7.5 g of salt, 7.5 g of yeast, 25 g of oil, and 300 mL of water were needed for the recipe. Using a mixer (Brabantia, Eindhoven, Netherlands) set to speed 1, the dry ingredients, water, yeast, and wheat flour were combined to form the dough for five minutes. The machine was turned off after ten more minutes at speed three to allow the elastic dough to come together. The dough was permitted to rest for half an hour before being hand-kneaded for five minutes. The 100 g portions of dough were separated, carefully rolled, rounded, and baked. [6]

**Fig.1**



2. Mushroom Powder Preparation

Two types of mushrooms were harvested within twenty-four hours of each other: oyster mushrooms (*Pleurotus ostreatus* (Jacq.) P. Kumm.) and white button mushrooms (*Agaricus bisporus* (Lange) Sing.). The mushrooms were acquired straight from the mushroom grower. Before the treatments, the raw components were chilled for storage. On a wet weight basis, the moisture content of button mushrooms was 92.19%, whereas that of oyster mushrooms was 90.51%. The early phases of mushroom preparation were washing and cutting into slices (3–4 mm). The raw material was frozen at -80°C for 24 hours, and then dried in a lyophilizer (Christ Alpha 1-2 LD plus, Germany) for 72 hours. The resulting lyophilisates were processed into flour in a laboratory mill (Retsch GM200, Retsch GmbH, Haan, Germany) at 8000 rpm for four minutes. Next, the particles were sieved.[7]



Fig.2

3. Making the Shortbread Cookies

The following components were used to make the shortbread biscuits (control samples): Agrowita Sp. z o.o., Moja Kurka, 40 g of yolk, 100 g of powdered sugar (Pfeifer & Langen Marketing Sp. z o.o., Diamant), 240 g of butter (Mlekovita, 82% fat), and 360 g of wheat flour (GoodMills Polska Sp. z o.o., Plony Natory, type 450). Powdered lyophilisates (2%, 4%, and 6% w/w) were partially substituted for wheat flour to create different variations of cookies. A Thermomix TM6 (Vorwerk Elektrowerke GmbH & Co. KG, Wuppertal, Germany) was used to prepare the dough. First, two minutes were spent mixing the flour and sugar. Then, the dough was stirred for another 3 min after adding the butter and next the yolk.[8]



Fig.3

4. Production of Cupcakes

Using varying degrees of composite flour (Table 1) in place of wheat flour, the cupcakes were made using the Rahut et al. (2012) method. Figure 1 shows the cake production process. Accurate measurements were taken for each cupcake's ingredients, which included wheat flour, orange-fleshed sweet potatoes, mushrooms, and shortening (Golden Penny Margarine, Flour Mills of Nigeria). The ingredients were then combined in a bowl with a mixer (Kenwood, A901) until the batter was frothy and creamy.[9]



Fig.4

Ingredients

- a) Wheat flour
- b) Orange fleshed sweet potato
- c) Mushroom
- d) Sugar
- e) Shortening
- f) Baking powder
- g) Whole eggs

Procedure

- a. Weighing of material (wheat flour , mushroom and of sp.)
- b. Mixing of sugar and shortening
- c. Addition of one whole egg and mixing
- d. Addition of flours made from mushrooms, orange-fleshed sweet potatoes, and wheat
- e. Mixing of batter
- f. scrapping of sticky batter
- g. Mixing another whole egg with the batter
- h. Portioning of batter into pans
- i. Baking at 170°C for 40 min.
- j. Cooling
- k. Cake

5. Preparation of Dried Mushroom

After being cleaned with tap water, the oyster mushrooms were blanched for seven minutes in steam, dried for five hours at 60°C with an air fan in a thermostatically controlled oven, and then ground in a laboratory disc mill to pass through a 20 mesh/inch screen (Deshpande and Tamhne, 1981).

Beneficial effects of Mushrooms on Human and Animal Health & Their Nutrition

Although studies on the effects of mushrooms on human health have only recently become interesting, particularly in Europe, the use of mushrooms in Chinese folk medicine and other Eastern countries has long been known (Wasser 2014; Gründemann et al. 2020). Furthermore, because of the actions of bioactive substances on the human body, consumers' attention is increasingly being drawn to the role that include mushrooms in the diet can play in promoting health and lowering the risk of disease. Biological response modifiers (BRMs), which are antitumor MM medicines, are used to treat various cancer kinds and patients receiving chemotherapy and radiation therapy. By minimizing side effects and preventing cancer progression, BRMs improve patients' quality of life. Many MM products have been created thus far for both commercial and therapeutic uses, particularly from species that are common and utilized in the East.[10]

**Fig.5****Advantages of Mushroom**

- Improves Heart Health
- Good For Diabetes
- Boosts Immunity
- Lowers Blood Pressure
- Keeps Brain Healthy
- Improves Digestion

DISCUSSION AND RESULT

A crucial component of bread quality, loaf volume offers a qualitative gauge of baking performance. The order of the specific volume decrease was Control > 5% > 10%. In general, adding more proteins to gluten-free bread results in a lower specific volume; however, the nutritional benefit was still apparent despite the negative effects on instrumental quality metrics. A high specific volume indicates a higher crumb porosity, which is linked to freshness, making it a desirable quality (Cauvain., 2015). There are two reasons for the decrease in loaf volume: 1) being unable to contain carbon dioxide that has fermented because of fiber weaning, or damaging the structure of the dough because of a decrease in glutenin, as noted by Matsushita et al.

CONCLUSION

The protein, fat, ash, and fiber content of the cake were all increased by the addition of mushroom powder. As the amount of mushroom powder in the recipe grew from 5% to 15%, the cake's protein, fat, ash, and fiber content increased while its sugar content decreased. The results of the organoleptic trait test showed that the amount of mushroom powder used had a significant impact on the color, flavor, texture, and overall acceptability of the cakes; however, partial substitution of 10% mushroom powder with wheat flour produced more gratifying results. The results show that adding 10% mushroom powder to a cake without eggs can successfully boost its nutritional value without sacrificing its acceptable sensory qualities. The effectiveness of mushroom powder as an addition in bread recipes was assessed in this study. The conducted investigation demonstrates the impact on the particular volume, texture, and color of the bread. In summary, there is a certain volume reduction in mushroom bread. Based on the findings of the texture investigation, the mushroom powder adds to the bread's increased firmness, rubberiness, and springiness. Moreover, there was less cohesiveness and softness in the mushroom bread. In terms of hue, the mushroom bread was likewise darker than the control. The choice of mushroom powder, however, is up to the individual. However, it seems like mushroom powder might work well as an extra component in bread goods.

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STUDY ON EUGENOL AS A POTENTIAL ANTIBACTERIAL AGENT AGAINST: *Streptococcus mutans* and *Escherichia coli*

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ABSTRACT

The increased population of antibiotic resistant bacteria limits the successful treatment of infectious diseases. The World Health Organization reports the antibiotic resistance shows a serious risk to public health since the bacteria are becoming resistant to antibiotics for two main reasons. This makes it harder to treat infections and highlights the need for better monitoring solutions. Eugenol a secondary metabolite obtained from clove buds has high potential in the field of biomedicine. Natural products are appealing due to their effectiveness, lower toxicity, and easy availability. Historically, these remedies have been used for treatment since ancient times, before the advent of modern antibiotics. Therefore this study aims to evaluate the antibacterial activity of eugenol as an alternative remedy for antibiotic resistance. Two pathogenic bacteria were tested: *Streptococcus mutans* and *Escherichia coli*. The inhibitory effect of commercially available eugenol was screened by Kirby Bauer method, Minimum Inhibitory Concentration, Maximum Bactericidal Concentration (MIC and MBC). Confocal Laser Scanning Microscopy (CLSM) are utilized to distinguish between live and dead bacterial cells by using fluorescent dyes on biofilms. In contrast, Scanning Electron Microscopy (SEM) is used to examine the surface structure and material makeup of the cells. The following day after culturing, zones of inhibition were observed and measured in millimeters from the culture plates. Both bacteria showed zones of inhibition, but a larger zone was observed for *S. mutans* compared to *E. coli*. Images from Confocal and scanning microscopy indicated a higher proportion of red fluorescence that signifies dead cells, suggesting that cell membrane disruption contributes to cell death. The study reveals that eugenol effectively control the growth of these pathogenic bacteria and can be exploit as a natural antibiotic with lesser side effects. The present study differs by focusing on the bacterial strains that are responsible for many infectious diseases worldwide. By examining these specific pathogens, this research aims to provide new insights into the effectiveness of eugenol against a broader range of infectious agents.

KEY WORDS: Antibiotic Resistance, Eugenol, *Streptococcus mutans* and *Escherichia coli*

2: INTRODUCTION

The advancement of antimicrobial agent has significantly transformed human and animal health by a dramatic change in the war against infectious diseases which resulted in the survivability of both humans and animals. But now there is a growing concern regarding the increasing number of pathogenic bacteria becoming resistant to antimicrobial compounds. In microbes specifically, the bacteria can modify them quickly to resist antibiotics and drugs. The mechanism of resistance is complicated and varied. Though medical research has attained high quality treatment and therapy, still we are taking benefit of ancient anti-microbial principles and resources for the treatment.

Recent findings suggest that the speed at which bacteria acquire resistance far outpaces the development of new or modified antibiotics. The resistance of bacteria against antimicrobial agents is due to the mutation, by plasmid or transposon acquisition, or by the intrinsic properties present in microorganisms that confirm the resistance. *S. mutans* and *E. coli* are among the bacteria's responsible for most of the infectious diseases worldwide that becomes a major public concern.

It is therefore pertinent to find alternate strategies and compounds which are more effective with high healing potential. Scientists researched natural products rather than those developed chemically; one such product is essential oil. These have been used in folk medicine since ancient times. These are used as powerful tool for the treatment of infectious diseases like respiratory, urinary, and dental



problems. Herbs and spices are particularly suitable for this purpose, with cloves standing out as a prime example. Cloves have a long history of use in both Ayurvedic and Chinese medicine, with the flower buds being the primary component employed to address various health issues. In the current research we have selected eugenol as an essential compound due to the higher antimicrobial and antioxidant capability. While numerous studies have examined these topics, but the ongoing but still there is a grey area in relation to research the pertaining to the two bacteria

3. MATERIALS AND METHODOLOGY

Eugenol (commercially available), glassware's, BHI media for *S. mutans*, nutrient broth, nutrient agar and the two screened bacteria's in this study were obtained from MTCC (Microbial Type Culture Collection). One Gram- positive and one Gram-negative bacteria were tested.

Table 1: List of bacterial strains used

S.No	BACTERIA	STRAIN TYPE	MTCC NUMBER
1	<i>E coli</i> dh5alpha	Gram negative	MTCC1652
2	<i>S mutans</i>	Gram positive	MTCC497

3.1 Maintenance of culture

a) Preparation of Liquid Media

Weigh 0.325 gm of nutrient broth and mix with 25ml of distilled water in conical flask. (1.85 gm of BHI was weighed and added to 50ml of distilled water in a beaker for *S mutans*). Mix well till it dissolve and the pH of the solution was adjusted to 7.4. After proper mixing the media was distributed to different conical flasks and kept in autoclave for sterilization.

b) Preparation of Solid Media

Weigh 3.25gm of nutrient broth (1.85gm of BHI in case of *S mutans*) and 3.75 gm of bacteriological agar; add both of these to 250ml distilled water in beaker. The solution is mixed well and it was then autoclaved.

c) Preparation of Inoculums

Autoclaved flasks containing the 50 ml nutrient media were taken and then with the help of sterile inoculating loop 2 microgram of streptococcus mutans from preserved culture plates /slants were scraped and put in their respective flasks and all the flasks were shaken and kept overnight in an incubator set at 35°C. Turbidity observed the next day indicate the presence of bacterial growth.

d) Preparation of Media Plates

The autoclaved molten agar was poured into the desired number of plates. After 15 minutes the media was solidified and then the media plates were stored in the refrigerator.

The methodology employed in this study is the Kirby- Bauer disk diffusion antibiotic sensitivity testing protocol followed from Jan Hudzicki -2009 American Society for Microbiology.

Table 2: Protocol for Kirby Bauer Method

Eugenol (µl)	1	2	3	4	5	0
DMSO (µL)	14	13	12	11	10	15
Total	15	15	15	15	15	15

3.2. Minimum Bacterial Concentration

The MBCs were determined by observing the growth of bacteria on nutrient agar plates containing increasing concentrations of EO. The lowest concentration with no visible growth was defined as the MBC, indicating 99.5% killing of the original inoculums.

3.3. Minimum Inhibitory Concentration;

This term typically applies to chemicals called antibiotics, drugs that kill bacteria, and thus microorganisms called bacteria. The MIC is typically stated in micrograms/milliliter (MIC in Pharmacology).

**Table 3: Protocol to determine MBC and MIC**

Test tube No	Quantity of eugenol (µl)	Quantity of DMSO(µl)	Bacterial media (µl)	Bacteria(µl)
1	2	28	265	5
2	4	26	265	5
3	8	22	265	5
4	16	14	265	5

The eugenol was diluted to 100 times, 1000 times and 10000 times. According to the protocol all were pipetted in a microtitre plate. Incubated for 24 hrs at 37C. The final readings were taken in ELISA reader at 595nm

3.4. Live Dead Cell Assay

For live dead cell assay freshly grown bacterial cells were treated with eugenol and were washed. Then it is stained with FITC and PI to detect the fluorescence. Record fluorescent and view the image in CLSM. The red spots show the dead cell. The green spot represents the live cell.

3.5. Scanning Electron Microscopy (SEM)

SEM was performed using JOEL-JSM 6510 LV instrument to understand the sample topography and composition. Here *S. mutans* was taken as a representative organism. The bacterial cells were treated with EU and incubated for 3-5 hrs. The non-treated bacterial cells were served as a control. All the cells were washed with PBS (pH-7.4) several times followed by fixing the cells with 2.5 % glutaraldehyde at room temperature for 20 min. After fixation step again wash the cells several times with PBS. The obtained pellet was dehydrated with increasing concentration of ethanol after this microscopic examination was performed. Finally sample was coated with gold and analyzed by SEM (University Sophisticated instrumentation center, AMU).

4. RESULTS

The disk diffusion method was used to screen the antimicrobial activity. Next day zone of inhibition were observed and recorded. Below are the images of zone of inhibition for eugenol against two bacteria.



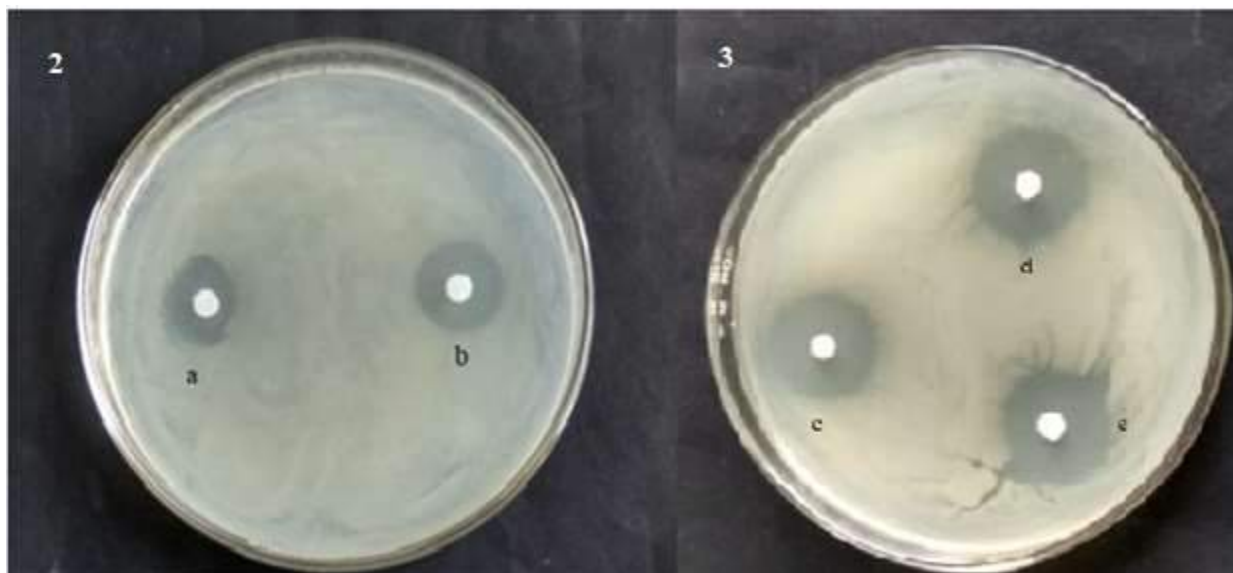


Figure 2&3: Standardized zone of inhibition of eugenol against *S. mutans* (a) 1µl of eugenol (b) 2 µl (c) 3µl (d) 4µl and (e) 5 µl of EU. The zone of inhibition was measured in mm.

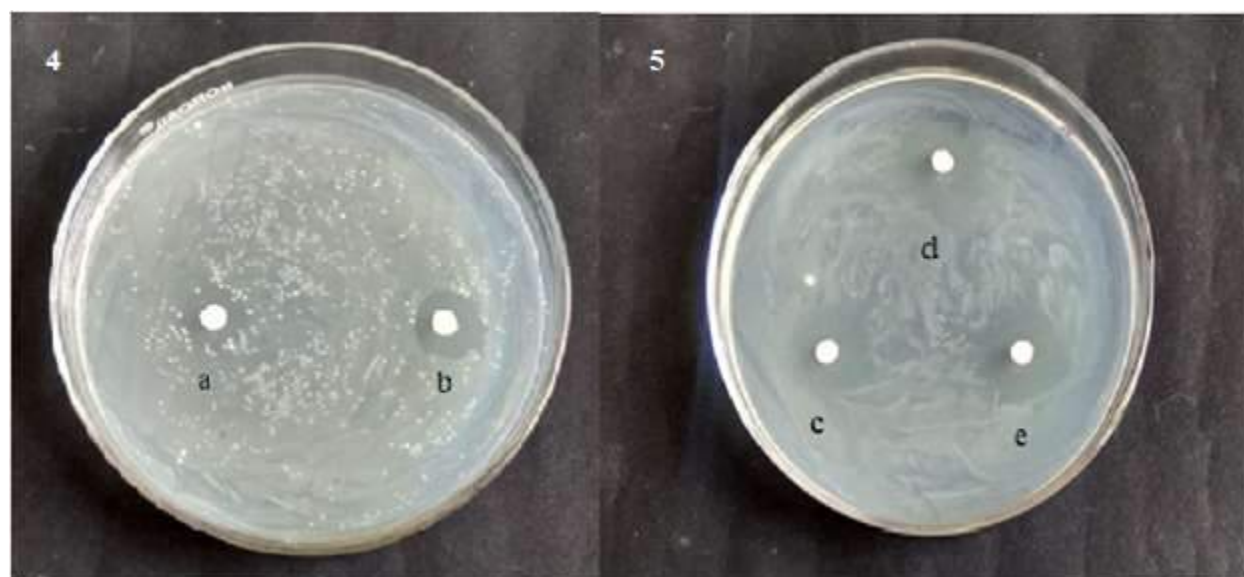


Figure 4& 5: Standardized zone of inhibition of eugenol against *E. coli* (a) 1µl of eugenol (b) 2 µl (c) 3µl (d) 4µl and (e) 5 µl of EU. The zone of inhibition was measured in mm.

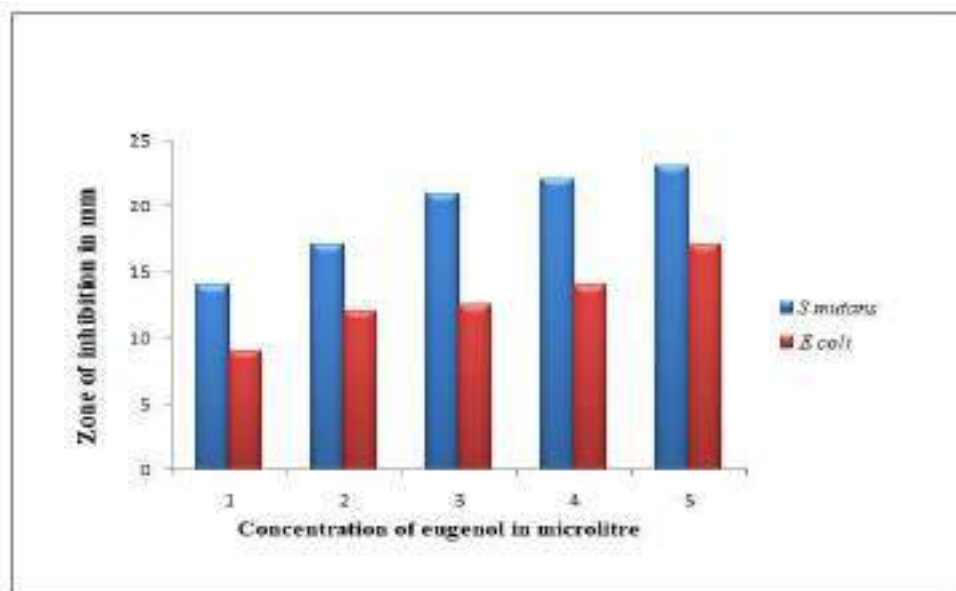


Figure 6: Depicts antibacterial activity of eugenol against the two bacteria which reveals that *S. mutans* show more inhibition as compared to *E. coli*.

Determination of MBC and MIC

Table 4: Table for MBC and MIC values of two bacteria

Eugenol	Bacteria	MBC (µg/ml)	MIC (µg/ml)
	<i>S. mutans</i>	50.4 µg/ml	40.32 µg/ml
	<i>E. coli</i>	403.2 µg/ml	201.6 µg/ml

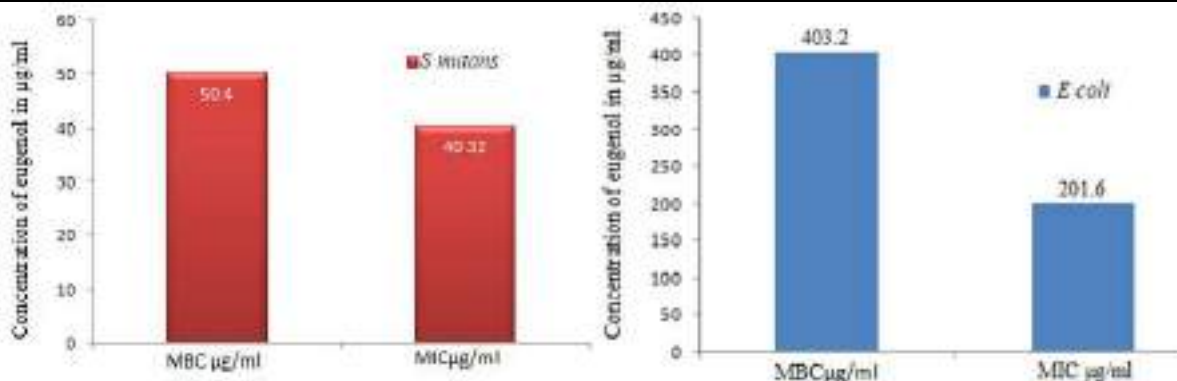


Figure 7: Graphical representation of MBC and MIC values of *S. mutans* and *E. coli*

Live Dead Cell Assay

Table 5: Live/dead bacterial cell analyzed by CLSM

	E Coli (Gram Negative)		S Mutans (Gram Positive)	
	Control	Treated	Control	Treated
Fluorescence Color	Only Green	Both Green And Red	Only Green	Both Green And Red
Color intensity	Higher green fluorescence	Higher red fluorescence with moderate green fluorescence	Higher green fluorescence	Higher red fluorescence with moderate green fluorescence
% of Bacterial Cell Killed	-	~80	-	~80

SEM analysis of *S mutans*

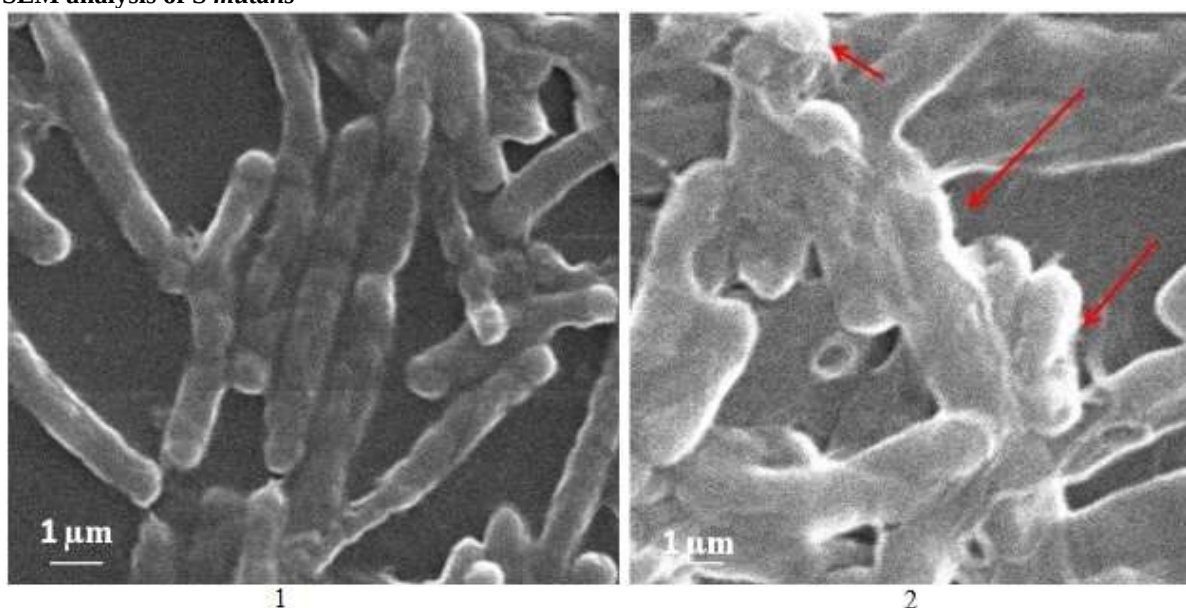


Figure 8: SEM analysis of *S mutans* (1) control of *S mutans* not treated with eugenol. (2) *S mutans* treated with eugenol.

5. DISCUSSION

The addition of eugenol to the broth culture effectively inhibited the growth of both *S. mutans* and *E. coli*, with a more pronounced effect observed on the gram-positive *S. mutans* compared to the gram-negative *E. coli*. Zone of inhibition of *S mutans* is as follows (14mm, 17mm, 21mm, 22mm, and 23mm), and in *E coli* is observed as (9mm, 12mm, 12.5mm, 14mm, and 17mm). Some authors have reported that Gram-positive bacteria have higher sensitivity than Gram-negative bacteria. This study also reveals the same. The efficiency of eugenol against these pathogenic bacteria provides a scientific ground for the application of eugenol in the treatment of infectious diseases.

MBC value for *S mutans* is 50.4μg/ml and MIC obtained is 40.32μg/ml. This suggests that even in small quantities eugenol shows potential activity against *S mutans*. The MBC value obtained for *E coli* is 403.2μg/ml and MIC is 201.6μg/ml.

In CLSM both the bacteria and non-treated bacterial cells emitted higher intensities of green fluorescence without any red fluorescence indicating all live or healthy cells (table 10). In case of *E. coli* when the cells were treated at MBC (at mention the values) for about 4-5 hrs there was both visible red along green fluorescence however the fluorescent intensity of the red color was much higher than green indicating 80 % of the dead cells. Similarly in the case of *S mutans* the fluorescence intensity of red color was observed along with moderate green fluorescence indicating 80% of the dead cells therefore equally bactericidal against both the tested organisms. From above results, it can be speculated that eugenol effectively induces bacterial cell membrane damage making them permeable which ultimately results in the release of intercellular metabolites and consequently cell death.



SEM images inferred that the eugenol acts on the cell membranes of the bacteria. Disruption of the bacterial cell membrane is the most frequently reported mechanism contributed by essential oils. The most frequently reported mechanisms are disruption of bacterial membranes contributes to the antibacterial properties of most EOs. Damage to membrane proteins (e.g. enzymes), cell content leakage, depletion of the motive proton force, and coagulation of the cytoplasm are also common effects. Although the site of action of individual EO components has been established in many cases, the mechanism itself is often still not completely understood.

The result of the study presents eugenol as a potential alternative antibacterial agent that combats infection-causing bacteria such as *S. mutans* and *E. coli*.

6. CONCLUSION

- The research indicates that eugenol may serve as an effective antibacterial agent against the pathogenic bacteria examined, with gram-positive bacteria showing greater resistance.
- The minimum inhibitory concentration (MIC) and minimum bactericidal concentration (MBC) for *Streptococcus mutans* were found to be 50.4 µg/ml and 40.32 µg/ml, respectively.
- In contrast, for *Escherichia coli*, the MIC and MBC values were 403.2 µg/ml and 201.6 µg/ml, suggesting that this gram-negative bacterium also exhibits sensitivity to eugenol.
- Eugenol's antibacterial mechanism involves disrupting the integrity of the bacterial cell wall, as evidenced by scanning electron microscopy (SEM) images.
- Consequently, eugenol has potential as a natural antibacterial agent for treating infections caused by *S. mutans* and *E. coli*, and no adverse side effects have been reported.

LIST OF ABBREVIATIONS

1. BHI	Brain heart infusion
2. CLSM	Confocal Laser Scanning Microscopy
3. <i>E. coli</i>	<i>Escherichia coli</i>
4. EO	Essential oil
5. EU	Eugenol
6. FITC	Fluorescein isothiocyanate
7. ISO	International Organization for Standardization
8. MBC	Minimum Bactericidal Concentration
9. MDR	Multiple drug resistance
10. MIC	Minimum Inhibitory Concentration
11. PI	Propidium iodide
12. <i>S. mutans</i>	<i>Streptococcus mutans</i>
13. SEM	Scanning Electron Microscopy

AVAILABILITY OF DATA

All data analyzed during this study are included in this published article.

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ANTICARCINOGENIC EFFECTS OF GULGULUTHIKTHAKAM KASHAYAM AND EMILA SONCHIFOLIA EXTRACT ON TUMOUR INDUCED MICE

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ABSTRACT

The study investigated the Anticarcinogenic effect of Gulguluthikthakam Kashayam and Emilia sonchifolia extract on tumor induced mice. The study focused on plants with antineoplastic and anti-cancer activity which are not scientifically evaluated. Invitro assays were conducted in hemolysate, liver, kidney & heart and statistical analysis were done for each. A significant decrease was observed in parameters like LDH, ALP, GPT, GOT, HMG CoA Reductase, GSSG, TBARS, Total proteins, Albumin, DNA, Total lipid, Phospholipid, Cholesterol, FFA, Total hexose, Fucose, Sialic acid, WBC and Catalase, G-PX, TG, Ascorbate, Clotting Time was found to be increased in drug treated groups compared to tumor control groups. The candidate drugs show anticarcinogenic activity.

KEY WORDS: anticarcinogenic, Gulguluthikthakam, Emilia sonchifolia, tumor induced, medicinal plants

INTRODUCTION

Cancer is a regulatory dysfunction where the repertory of gene capabilities fails to orchestrate congruously. The life sustaining mechanism is super sophisticated and very occasionally the regulatory system fails and apoptosis is disturbed. Though several theories are available on the incidence of cancer like immunity theory, selective gene activation theory, metabolic theory, the therapeutics remain futile in later stages. Cancer cells are potentially immortal and loss contact inhibition of movement property. Alteration in surface protein enables the cancer cells to escape from the immune system and loss of cell specific adhesiveness and anchorage make them to grow in chaotic mass.

Biochemical changes constitute increased glucose consumption by cells, but O₂ can't enter the membrane due to the attachment of carcinogen. In absence of O₂, glucose undergoes anaerobic glycolysis and pH drops to 7- 6.5. In acidic medium, DNA losses its positive and negative radial sequences, the amino acids entering the cells, RNA changes occurs and its control mechanisms are completely lost which results in chromosomal aberration. Surface enzymes are altered. Lysosomal enzymes become toxic and leak out from the tumor mass, poison the host generating pain. New antigenic surface proteins appear which are immunologically distinct from normal cell antigens. Cancer cells secrete plasminogen activator, which dissolves intracellular matrix.

Tumor derived markers and tumor associated markers used to determine the extent of disease. They include isoenzymes, ferritins, c-reactive protein, macroglobulin. CEA determination in colonic cancer, and prostatic ACP in prostatic carcinoma. Treatment of Cancer is in stages: Curative, Palliative and Adjunctive and the common modalities are Surgery, Radiation, Chemotherapy, endocrine therapy and Immunotherapy

Many plants are used to treat cancer in ethnomedical practices in different parts of the world. About 25-30% of anti-tumor drugs are of plants origin. In Indian folklore medicine, many plants are used in the treatment of cancer which are not scientifically evaluated. New experimental studies could provide a hopeful therapy in alleviating the mystery of cancer.



Gulguluthiktakam Kashayam is an aqueous extract of numerous medicinal plants which helps in inducing immunological surveillance. Ayurveda prescribes that continuous usage of this drug can protect the body from diseases. *E. sonchifolia*, herbaceous plant used in folklore against inflammation, rheumatism, tonsillitis etc. Aerial parts of this plant is reported to contain flavanoids, kampferol 3-B-Dgalactose, Quercetin, ursolic acid, n-hexacosanol and triconate. Apart from its antimicrobial, antifungal and estrogenic activity, it acts as an antineoplastic agent. It helps in the induction of cell specific apoptosis and protects from DLA. Studies reveal that methanolic extract is cytotoxic towards EAC and DLA tumor lymphocytes (NHL). Flavonoids have chemo preventive role in cancer through effects of signal transduction in cell proliferation and angiogenesis.

MATERIALS AND METHODS

Experimental animals were Inbred strains of Swiss Albino male mice of 4 -5 weeks of age with body weight of 17-20g. The mice were fed stock laboratory diet and water was given water ad libitum.

The chemicals employed were of analytical reagent grade. Drug for the study: Gulguluthikthakam Kashayam' and Emilia sonchifolia extract. For in vitro and in vivo studies, DLA cell lines were used. Tumor cell lines were aspirated from peritoneal cavity of tumor bearing mice and washed with PBS until a white clear mass of tumor cells sediment. Cells were counted in hemocytometer. Tumor was maintained in Swiss Albino mice, of 17-20g body weight, by intra peritoneal injection of million cells in PBS (0.7ml) Palpable Ascites tumor appears within 8-12 days with a life span of 25-27 days. Swiss Albino male mice were grouped into VIII groups of 6 mice each

Group I - Normal Control-Saline

Group II -Tumor control- injected 1×10^6 cells of DLA cell line

Group III - Preventive Drug 1, -Tumor transplanted, drug 1 administrated after 24 hours, for 10 alternate days.

Group IV - Preventive Drug 2, -Tumor transplanted, drug 2, administrated after 24 hours, for 10 alternate days.

Group V - Curative drug 1, - Tumor transplanted, Drug 1, administered from 10TH day, for 10 alternate days.

Group VI - Curative drug 2, Tumor transplanted and drug 2, administered from 10TH day for 10 alternate days.

Group VII -Drug 1 control- Drug 1, alone for 10 alternate days

Group VIII -Drug 2 control -Drug 2, alone for 10 alternate days.

In vitro cytotoxicity study of the extract was studied by trypan blue exclusion method. Drug fraction that can produce 50% of the cell death in vitro was chosen as lethal dose 50 (LD50). In vivo Cytotoxicity studies, two groups of mice (6each) were selected. Group I is administered with normal saline and group II with different concentration of drug (20,40,60,80 and 100 mg) and longevity was studied.

Measurement of Tumor Development

Diameter of the mice were measured using vernier calipers and body weight of the mice on 5th day, 10th day,15th day & 20th day and average were noted.

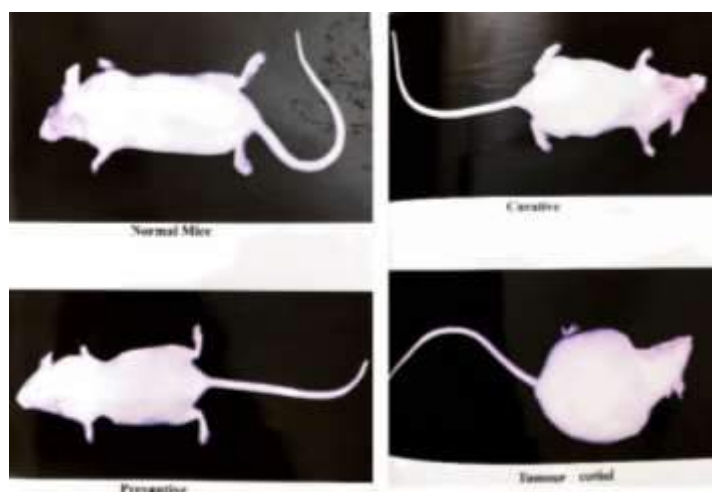


Figure 1 shows images of mice on 20th day.

Collection of samples & Extraction methods

The mice were sacrificed by decapitation. Blood was collected from the jugular vein, transferred to cold containers. The RBC was washed thrice with physiological saline and made up to 6ml with distilled water. This hemolysate used for estimations



The decapitated mice were dissected, tissues were removed, transferred to ice cold containers. A part of tissues was preserved in 10% formalin for histopathology. Extraction of tissues for different parameters were prepared using particular extraction methods.

METHODS

Alkaline phosphatase activity was estimated by the method of Kind and Armstrong, LDH by Mc Queen method, HMG COA Reductase by Rao and Ramakrishna method. Glutamate Oxaloacetate Transaminase and Glutamate Pyruvate Transaminase activity was estimated by the method of Reitman and Frankel, Catalase activity by method of Machly A et al, Glutathione peroxidase Activity by Rotruck et al, Estimation of Reduced Glutathione by Butler & Kelley. GSSG by Patterson & Lazarow. Conjugated dienes by John et al. Ascorbate by Klin et al. DNA by Burton method. The total lipid by Phosphovanillin method, phospholipids by Silversmith and Davis. The total triglyceride by Hantzsch method. Free fatty acids by the method of Falbalt et al. Estimation of total cholesterol by Zlatkis method. The method of Lowry for protein estimation. Albumin by BCG method. Fucose by Dische & Schlte. Total hexose by phenol - sulphuric acid method. Sialic acid by the method of Warren. Enumeration of WBC using Hemocytometer and Clotting time by capillary method.

STATISTICAL ANALYSIS

The data given in the tables are the mean average of the values from six rats indicated in each case as Mean +SD. Statistical significance was calculated using students t' test

$$\text{Standard deviation, SD} = \sqrt{\frac{\sum (x - \bar{X})^2}{n - 1}}$$

$$n - 1$$

$$\text{Combined standard deviation, CSD} = \sqrt{\frac{\sum (x_1 - \bar{x}_1)^2 + \sum (x_2 - \bar{x}_2)^2}{n_1 + n_2}}$$

$$n_1 + n_2$$

$$\text{'t' test} = \frac{\bar{x}_1 - \bar{x}_2}{\text{CSD} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}}$$

$$\text{CSD} \sqrt{\frac{1}{n_1} + \frac{1}{n_2}}$$

Where,

$\bar{x}_1$ -Mean of the first sample

$\bar{x}_2$ - Mean of the second sample

n_1 - Sample size of the first group

n_2 - Sample size of the second group

A test group is compared with its control group to find out if there is any significant difference in their values between the groups.

Histopathological Results- Table 2

Normal	Tumor	Preventive	Curative
Normal tissue architecture of cells	Excessive loss of tissue architecture, necrosis, inflammatory infiltration	Normal tissue architecture, no necrotic atypia, mild inflammatory infiltrate	Few scattered inflammatory infiltrates.

Table 2 shows histopathological results of normal mice, tumor bearing mice, preventive group and curative group mice.

**RESULTS (t value and p value)****1.ALP concentration (values are expressed in mg/dl or 100mg and are mean of 6 mice + SD)**

GROUP	DRUG	HEMOLYSATE t Value/ p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	43.6713/<0.001	39,916/<0,001	69.6133/<0.001	408.1941/<0,001
Normal control x Drug control	GUL	16.0822/<0.001	131.5884/<0.001	113.1376/<0.001	9.531/<0.001
Tumor control x Preventive	GUL	25.2051/<0.001	19,4889/<0.001	43.8538/<0.001	81.99/<0.001
Tumor control x Curative	GUL	23.634S/<0.001	9.4889/<0.001	34.7565/<0.001	96.56/<0.001
Normal control x Drug control	ES	000/NS	18.57/<0,001	0.665/<0.1	1.5301/<0.1
Tumor control x Preventive	ES	29.1989/<0.001	14.8545/<0.1	18.2535/<0.001	352.3178/<0.001
Tumor control x Curative	ES	29.8116/<0.001	13.2576/<0.001	13.7033/<0.001	72.3312/<0.001

GUL -GULGULUTHOKTHAKAM KASHAYAM, ES -EMILIA SONCHIFOLIA**2.Activity of ALT (values are expressed in IU/L and are mean of 6 mice + SD)**

GROUP	DRUG	HEMOLYSATE t Value/ p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	4.2212/0.001	3.9497/<0.002	4.0684/<0.002	0.04716/0.1
Normal control x Drug control	GUL	170,808/0.001	25.094/<0,001	25.094/<0,001	25.094/<0,001
Tumor control x Preventive	GUL	25.094/<0,001	36.0873/<0,001	65.7972/<0.001	63.4788/<0,001
Tumor control x Curative	GUL	2.9776/<0.001	5.8348/<0,001	27.6382/0.001	23.8183/<0.001
Normal control x Drug control	ES	28.867/<0.001	68.396/<0.001	93.6349/<0.001	61.2943/<0.001
Tumor control x Preventive	ES	28.8674/<0.001	12.4202/<0,001	79.7031/<0.001	36.0723/<0.001
Tumor control x Curative	ES	31.1967/<0.001	21.5143/<0.001	42.3802/<0.001	31.5069/<0.001

3.Activity of AST (values are expressed in IU/L and are mean of 6 mice + SD)

GROUP	DRUG	HEMOLYSATE t Value/ p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	361.145/<0.001	159.65/<0.001	65.8784/<0.001	36.33/<0.001
Normal control x Drug control	GUL	180.36/<0.001	5.11/<0.001	15.923/<0.001	0 /NS
Tumor control x Preventive	GUL	26.713/<0.001	17.31/<0.001	35.67/<0.001	17.31/<0.001
Tumor control x Curative	GUL	15.801/<0.001	11.57/<0.001	35.69/<0.001	4.22/<0.002
Normal control x Drug control	ES	70.189/<0.001	16.187/<0.001	1.3936/NS	26.5148/<0.001
Tumor control x Preventive	ES	96.8397/<0.001	14.135/<,001	16.0664/<,001	9.9853/<0.003
Tumor control x Curative	ES	35.1972/<0.001	17.187/<0.001	4.897/<0.001	5.4660/<0.001

4.Ascorbate concentration (expressed in mg/dl or 100mg and are mean of 6 mice + SD)

GROUP	DRUG	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	19.54/<0.001	5.1245/<0.002	36.0450/<0.001
Normal control x Drug control	GUL	4.1374/<0.01	1.3843/NS	9.1314/<0.001
Tumor control x Preventive	GUL	5.912/<0.001	5.1952/<0.002	26.3741/<0.001
Tumor control x Curative	GUL	0.7723/NS	0.1864/NS	21.18/<0.001
Normal control x Drug control	ES	12.61/<0.001	3.4705/<0.05	7.0364/<0.001
Tumor control x Preventive	ES	9.361/<0.001	2.23/<0.05	8.3137/<0.001
Tumor control x Curative	ES	5.2708/NS	0/NS	13.5197/<0.001

**5.Activity of GPX (Values expressed in IU/g or L and are mean of 6 mice + SD)**

GROUP	DRUG	HEMOLYSATE t Value/ p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal control x Tumor control	GUL	22.5602/<0.001	16.0940/<0,001	18.0552/<0.001	16.6601/<0.001
Normal control x Drug control	GUL	1.5827/NS	0.1664/NS	0.8851/NS	1.0745/NS
Tumor control x Preventive	GUL	16.5587/<0.001	15.1497/<0.001	12.9819/<0.001	45.1045/<0.001
Tumor control x Curative	GUL	12.0174/<0.001	15.8529/<0.001	12.2575/<0.001	25.0818/<0.001
Normal control x Drug control	ES	2.0423/NS	1.2436/NS	1.3607/NS	1.4425/NS
Tumor control x Preventive	ES	13.2875/<0.001	87.1645/<0.001	11.3914/<0.001	67.6276/<0.001
Tumor control x Curative	ES	16.4304/<0.001	27.1265/<0.001	14.2389/<0.001	61.6408/<0,001

6.Activity of GSH (Values expressed in IU/g or L and are mean of 6 mice + SD)

GROUP	DRUG	HEMOLYSATE t Value/ p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	38.1943/<0.001	16.9724/<0.001	53.964/<0.001	58,0220/<0.001
Normal control x Drug control	GUL	5.2925/<0.001	4.0063/<0.01	6.0154/<0.001	6.6943/<0.001
Tumor control x Preventive	GUL	25.0052/<0.001	10.0711/<0.001	12.7392/<0.001	21.1435/<0.001
Tumor control x Curative	GUL	10.0025/<0.001	3.618/<0.01	5.1989/<0.001	8.002/<0.001
Normal control x Drug control	ES	1.8636/<0.05	2.3056/<0.05	6.3144/<0.001	9.8044/<0.001
Tumor control x Preventive	ES	20.001/<0.001	0.7072/NS	17.333/<0.001	25.4652/<0.001
Tumor control x Curative	ES	3.78 16/<0.01	0.7072/NS	3.9285/<0.01	15,4992/<0.001

7.Activity of GSSG (Values expressed in IU/g or L and are mean of 6 mice + SD)

GROUP	DRUG	HEMOLYSATE t Value/ p Value	LIVER t Value/p Value	KIDNEY t Value/p Value	HEART t Value/p Value
Normal x Tumor control	GUL	30.9732/<0,001	35.0848/<0.001	22.9419/<0,001	26.078/<0.001
Normal control x Drug control	GUL	0.2619/<0.05	2.5037/NS	0.4833/NS	0.3276/NS
Tumor control x Preventive	GUL	10.8256/<0.001	9.3186/<0.001	9.2031/<0.001	6.0021/<0.001
Tumor control x Curative	GUL	9.0542/<0.001	9.3186/<0.001	5.3741/<0.02	3.009/<0.001
Normal control x Drug control	ES	0/NS	0.6325/NS	1.2051/NS	0/NS
Tumor control x Preventive	ES	18.6756/<0.001	26.1061/<0.001	12.9412/<0.001	10.0049/<0.001
Tumor control x Curative	ES	21.6882/<0,001	20.1717/<0.001	4.4851/<0.001	3.9498/<0.01

8.Activity of CATALASE (Values expressed in IU/g or L and are mean of 6 mice + SD)

GROUP	DRUG	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	6.18/<0.001	16.0124/<0.001	12.4285/<0.001
Normal control x Drug control	GUL	2.1228/<0.05	0.0999/NS	2.8759/<0.02
Tumor control x Preventive	GUL	2.0580/<0.05	13.4900/<0.001	15.4612/<0.001
Tumor control x Curative	GUL	1.2501/0.10	1.2250/NS	2.9250/<0.02
Normal control x Drug control	ES	1.7717<0,10	1.9513/<0.10	1.5035/<0.10
Tumor control x Preventive	ES	5.5281/<0,001	3.73 15/<0.01	5.5281/<0,001
Tumor control x Curative	ES	2.5111/<0.02	5.5281/<0,001	9.2982/<0.001

**9 CONJUGATED DIENES (Values expressed in IU/g or L and are mean of 6 mice + SD)**

GROUP	DRUG	HEMOLYSATE t Value/p Value	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	8.000/<0.001	9.4149/<0.001	10.2329/<0.001	19.9718/<0.001
Normal control x Drug control	GUL	0.0002/NS	0.9905/NS	1.6344/NS	0.6853/NS
Tumor control x Preventive	GUL	10.9587/<0.001	13.8698/<0.001	5.0306/<0.001	2.3808/<0.05
Tumor control x Curative	GUL	10.8745/<0.001	3.4641/<0.01	7.2375/<0.001	0.7325/NS
Normal control x Drug control	ES	1.0204/NS	1.1126/NS	1.1538/NS	1.2014/NS
Tumor control x Preventive	ES	2.3760/<0.05	23.292/<0.001	36.6815/<0.001	8.7403/<0.001
Tumor control x Curative	ES	8.63 15/<0.001	11.6353/<0.001	47.1415/<0.001	8.6730/<0.001

10. FUCOSE (Values expressed in IU/g or L and are mean of 6 mice + SD)

GROUP	DRUG	HEART t Value/p Value	LIVER t Value/p Value	KIDNEY t Value/p Value
Normal x Tumor control	GUL	24.4975/<0.001	21.2172/<0.001	43.8602/<0.001
Normal control x Drug control	GUL	1.4145/NS	0.6332/NS	0.6342/NS
Tumor control x Preventive	GUL	26.0067/<0.001	8.1027/<0.001	26.9223/<0.001
Tumor control x Curative	GUL	10.5864/<0.001	10.6085/<0.001	18.4206/<0.001
Normal control x Drug control	ES	3.5373/NS	2.0728/NS	1.4147/NS
Tumor control x Preventive	ES	10.0015/<0.001	13.8714/<0.001	23.4093/<0.001
Tumor control x Curative	ES	8.0023/<0.001	12.0061/<0.001	22.6421/<0.001

DISCUSSION

Anticarcinogenic effect of Gulgututhikthakam kashayam and Emilia sonchifolia extract on hemolysate, liver, kidney & heart parameters are evaluated in this study. The histopathological results suggest an alternation in normal architecture of cells with increased number of cells with fatty infiltration. Tumor marker enzymes show significant changes due to metabolic alterations. Catalase and GPX activities were found to be increased in drug control group over tumor control. LDH, ALP, ALT, AST and HMG Co-A reductase were found to be decreased in drug control over tumor control group. The antioxidant enzyme also shows significant changes indicate peroxidative damage to the cells. Ascorbate and GSH concentration were found to be increased while GSSG concentration has found to be decreased in drug control over tumor control. TBARS & Conjugated Dienes have found to be decreased & increased respectively in drug control over tumor. This may be due to the increase of lipids and lipid peroxidation. A decrease in total protein and albumin were observed in drug control than tumor. DNA was found to be increased and ascorbate decreased in tumor over normal mice which may be due to hyperplasia, increased anabolism and decreased catabolism, which is reversed in drug control mice.

Lipid parameters like total lipid, phospholipid, cholesterol, FFA were observed to be decreased in drug control over tumor, while TG levels were observed to be decreased. The aberration in lipid metabolism may be due to tissue injury, metabolic disorders, deficiency of essential lipotropic factors etc. The elevation of FFA and reduction of TG may be due to increased activity of Lipase. Carbohydrate components of glycoproteins like, Total hexose, Fucose & Sialic acid were observed decreased in drug control.

Hematological parameters like Leucocyte count were found to be decreased in drug control over tumor. Hematological parameters, WBC decreased significantly in drug treated mice, whereas clotting time increased. Increase in WBC in tumor may be due to increased granulopoiesis associated with specific immune mechanism. But clotting time decreased in tumor may be due to thrombotic disorders, due to increased platelet count, platelet adhesiveness and increased clotting factors. There was significant increase in tumor diameter and body weight of the mice from 1 - 20 days as the tumor volume increases progressively.

CONCLUSION

Anti-carcinogenic effect of Gulguluthikthakam kashayam and Emilia sonchifolia extracts reduced significantly the risk of malignancy. Significant decrease observed in LDH, AST, ALT, ALP, HMG-CoA reductase, GSSG, TBARS, Total protein, Albumin, DNA, Total lipid, Phospholipid, Cholesterol, free fatty acid, total Hexose, Fucose and Sialic acid. But Catalase, GPX, GSH, Ascorbate, TG, were found to be increased in drug treated groups. Hematological parameters, WBC were found to be decreased significantly in drug treated mice, clotting time was found to be increased.



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PHILOSOPHICAL ANALYSIS OF THE CONCEPT OF LABOR FROM THE PERSPECTIVE OF ARTIFICIAL INTELLIGENCE

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ABSTRACT

With the rapid development and widespread application of artificial intelligence technology, the concept of labor is undergoing unprecedented changes. The traditional concept of labor mainly revolves around human physical and mental labor, while the rise of artificial intelligence is gradually changing this situation. Robots, intelligent algorithms, and automation systems are replacing or assisting humans in completing many work tasks, which not only redefines the connotation of labor but also has profound impacts on the job market, labor productivity, and skill requirements. To better understand and respond to the labor transformation brought by artificial intelligence, traditional labor value theory needs to be updated to adapt to the new reality of the AI era.

KEYWORDS: Evolution of labor concept; Labor value theory; Digital labor; Artificial Intelligence

Currently, with the accelerating global new round of technological revolution and industrial transformation, the development and application of artificial intelligence are profoundly changing human production and lifestyle. Unlike the era of Marx and Engels, labor has shifted from physical labor to mental labor, with mental labor becoming increasingly prominent in the labor market. Examining the evolution of the labor concept and grasping the latest trends in labor forms is of great significance for upholding and developing Marx's labor value theory.

1. ETYMOLOGY ANALY

The character "勞" (Labor): Traditional Chinese character "勞". According to *Shuowen Jiezi · Force Radical*: "Labor means intense. From force and simplified form of 勞. Fire burning roof, those who use force labor. Burning roof refers to burning house. At this time those who use force labor most" (Xu, ca. 100 CE/1988, p. 700). It is formed by combining force and simplified form of 勞. 勞 represents fire disaster burning house, people using force to save from fire are very tired (Tang, 2018, p. 2036).

The main meanings of "勞" include: (1) Labor. As in *Mencius · Teng Wen Gong II*: "Some labor with their minds, some labor with their strength". (2) Diligent; hardworking. As in *I Ching · Dui*: "Pleased with the people, people forget their labor". As in *Guoyu · Yue Yu II*: "Labor without boasting of achievements". (3) Trouble; bother. Yao He's poem *Reply to Meng Attending Officer's Early Morning Visit*: "Lazy yet troubled to ask, climbing mountain has old ladder". (4) Merit. Han Yu's *Epitaph for Tai Yuan Prefecture Assistant Officer Miao Jun*: "Assisted Jiangxi envoy with merit". (5) Illness. *Huainanzi · Spirit*: "Like and hate make people's hearts ill". Gao You's note: "Labor means illness". (6) Worry. *Book of Songs · Bei Feng · Yan Yan*: "Indeed troubles my heart". (7) Excessive use. *Guanzi · Xiao Kuang*: "When sacrificial animals are not overworked, cattle and horses thrive". Yin Zhizhang's note: "Excessive use is called labor". (8) Comfort. *Book of Han · Gu Yong Biography*: "Comfort officials of two thousand bushels". (9) Same as "耨". Name of farming tool made of thorns or vines without teeth for leveling soil, also refers to using this tool to level ground. *Qi Min Yao Shu · Plowing Fields*: "Level twice" (Xia & Chen, 2011, pp. 2569-2570, 2582).

In bronze inscriptions, "labor" has "卂" (double hands) below, "爵" (wine vessel) above, broken lines in middle like wine flowing out, representing using both hands to raise wine vessel to comfort and reward those who have labored with merit. Since the double pillar form above 爵 resembles ancient form of 勞(ying), it was mistakenly elaborated into the above ancient form. Thus, the ancient meaning of hands raising wine vessel was completely lost. The seal script inherited the ancient form and added force radical, becoming force plus simplified 勞. After evolving to clerical script it was written as 勞. Now simplified as 劳 (Gu, 2008a, p. 384).

Shuowen · Force Radical: "Labor means intense" (Xu, ca. 100 CE/1988, p. 700). "Intense": Traditional character "劇". *Shuowen · Force Radical*: "務 means urgent. Urgent means hurry. Those who use force especially strongly" (Xu, ca. 100 CE/1988, p. 700). Zhu Junsheng



points out: "劇 is an erroneous form of 勵" (Zhu, 1983, p. 395). That is, 勵 was corrupted to 劇. The left part of 勵 is "虞". "虞 means fighting entangled without resolution". It describes degree of fierceness. Therefore, Duan's note says, from force and 虞, means "especially strong use of force". From this we can see 勵 means especially exerting effort (Tang, 2018, p. 2037). "務", according to *Shuowen*: "務 means urgent". Duan Yucai's *Notes on Shuowen Jiezi*: "Urgent means running fast. 務 means being hasty in matters". 務 means hurrying for something (Tang, 2018, p. 2987). From pictographic perspective, "labor" is closely related to word meanings like "diligent, hardship, merit, comfort".

"Motion": Traditional character "動". *Shuowen · Force Radical*: "Motion means action. From force, 重 gives sound". The original meaning is to carry on back (Gu, 2008b, p. 218). The main meanings of "motion" include: (1) Change from original position or state. Opposite to "static". *Book of Songs · Bin Feng · Seven Months*: "In fifth month locusts move legs". (2) Operation; action. *Mencius · Teng Wen Gong I*: "Will act throughout the year". (3) Use; employ. Su Shi's *Letter Advising Against Military Action on Behalf of Zhang Fangping*: "Since ancient times rulers like to use weapons". (4) Begin; initiate. (5) Move; change; shake. *Huainanzi · Spirit*: "Not moved by things". (6) Often; frequently. Zhuge Liang's *Memorial on Sending Out Troops*: "Discussing peace and planning, often citing sages". (7) Touch; affect (Xia & Chen, 2011, p. 966).

"Motion" is both ideographic and phonographic character. In bronze inscription *Mao Gong Ding*, "motion" is written as "童". "童" originally meant male slave. In bronze inscriptions, from 重 (a person with punishment mark on head carrying bamboo basket), from earth, meaning a person carrying heavy object standing on ground can carry it up. Ancient text added walking radical (辵), meaning motion. Seal script changed walking radical to force, indicating using force to carry things on back, 重 also indicating sound. After evolving to clerical script it was written as 動, now simplified as 动 (Gu, 2008b, p. 218). "Force", according to Xu Zhonghu's *Dictionary of Oracle Bone Inscriptions*: "Resembles shape of primitive farming tool lei. Perhaps because lei farming requires force, thus extended to mean force of strength" (Tang, 2018, p. 2985). From this we can see "motion" is related to using physical strength, exerting physical force.

Shuowen · Force Radical: "Motion means action. From force, 重 gives sound. Pronounced tu zong. Ancient text motion from walking" (Xu, ca. 100 CE/1988, p. 700). *Duan's Note*: "Action means rise". "From walking", Zhang Shunhui's *Brief Notes*: "When people rise they must walk, so ancient text motion from walking radical; movement must use force, so motion also from force" (Tang, 2018, p. 2036). We can see "motion" mainly means: action; movement.

"Labor-motion" is included in *Great Chinese Dictionary*, with meanings: (1) Operation; activity. *Zhuangzi · Yielding Kingship*: "Spring plowing planting, body sufficient for labor-motion". Now mostly refers to activities creating material and spiritual wealth. (2) Make uneasy; disturb, shake. *Records of Three Kingdoms · Biography of Zhong Hui*: "Disturb our borders" (Luo, 1990a, p. 717; He et al., 2015, p. 516). (3) Trouble; fatigue. Cao Zhi of Wei in Three Kingdoms' *Memorial on Chen Shen's Promotion*: "Why trouble imperial carriage to expose at borders!" (4) Similar to saying thank you, many thanks. Tang Wang Jian's poem *Replying to Yu Ruxi's Morning Snow Gift*: "Trouble to cut new pattern brocade again" (Luo, 1990b, p. 717).

In *The Great Dictionary of the Sea Economics* Volume, labor has two meanings. First, in the context of political economics, labor means: people's purposeful activity of changing labor objects to suit their needs. That is, the expenditure or use of labor power (Xia & Chen, 2003, p. 4). Second, in the context of labor economics, labor means: people's purposeful activity of using certain production tools to act on labor objects, creating use values to satisfy human needs. Under market economy conditions, labor mainly participates in production activities as a factor of production (Xia & Chen, 2003, p. 369). In *New Compilation of Ancient and Modern Chinese Dictionary*, labor's ancient meaning was: "trouble; activity; make uneasy". Today it retains the meaning of "trouble" and adds three meanings: (1) human activity creating material or spiritual wealth; (2) physical labor; (3) engaging in physical labor (Yuan, 1994, pp. 703-704).

The term "labor" has long existed in Chinese classical works, however its commonly used connotation today was introduced and enriched from Japan during the process of learning from the West in modern times. "Labor" once referred to a class of people, namely workers, worker groups, this group even formed its own "society", especially the lower society (Liu, 2017, pp. 22-31). With the spread of anarchism, Marxism and other new thoughts, "labor" gradually shifted from negative meanings of humble and passive to positive meanings of sacred and glorious. Among them, under the promotion of modern Chinese anarchism, "labor" gradually became generalized. Agricultural and factory production activities, intellectual creation activities were all incorporated into labor. In 1918, Cai



Yuanpei gave a speech - "Labor is Sacred": "Anyone who uses their own labor power to complete work beneficial to others, whether using physical or mental power, is labor... Labor is sacred!" (Ma, 2020, pp. 1-22). This was a high affirmation and praise of labor, where physical laborers and mental laborers each contribute according to their abilities with equal status, which was a breakthrough from the traditional view that "those who labor with their minds govern others, those who labor with their strength are governed by others". This speech by Cai Yuanpei not only promoted the transformation from the concept of "all four classes are scholars" to "all four classes are workers", but also further promoted the transformation of labor concepts and practices during the May Fourth Movement period.

Evidently, initially "labor" mainly meant operation, activity; trouble; disturbance and other meanings. With social development, the concept of labor gradually became enriched, deriving meanings referring to "a class of people" as well as today's commonly used meaning of "human activity creating material or spiritual wealth".

2. HISTORICAL EVOLUTION OF THE "LABOR" CONCEPT

###2.1 The Labor Concept in Agricultural Civilization

Ancient labor concepts differed from modern ones and did not carry political economic significance. In ancient times, labor's main meaning was physical activity. In medical texts, "labor" was used to refer to exercising the body, moving the body. As early as the pre-Qin period, the term "labor" had appeared. *Zhuangzi · Yielding Kingship* states: "Spring plowing planting, body sufficient for labor-motion". Here "labor" referred to activity, work. In ancient times, "labor" referred to physical activities engaged in by lower-class people, thus people once viewed only physical labor as labor. The ancients said: "Work at sunrise, rest at sunset". Since ancient times, Chinese people have been hardworking and diligent, creating a brilliant agricultural civilization. Meanwhile, scholars and literati wrote poems and painted, using these to praise labor and laborers, expressing sympathy for working people. As the mainstream thought of China's feudal society - Confucianism, although it attached great importance to agriculture and people's livelihood, in the feudal society led by "scholars", the status of physical laborers was relatively low. In ancient times, laborers were at the bottom of society, enslaved and exploited by a minority ruling class, leading to phenomena like "gentlemen labor with their minds, petty men labor with their strength, this is the system of former kings" and "those who labor with their minds govern others, those who labor with their strength are governed by others". Until modern times, the term "mental and physical labor" was still commonly used. Liang Qichao and Sun Yat-sen used "physical labor" to mean "labor". Overall, in ancient China, "labor" was related to physical activity and physical work, containing meanings of hardship and toil.

In Western discourse, the English word "Labor" mainly means: (1) work, especially heavy physical work; laborers, especially physical laborers. (2) childbirth. (3) Labour Party. (4) work hard, do something with effort (Oxford University Press, 2005, p. 747). The German word for Labor is "Arbeit", and both contain meanings of toil and fatigue. Cicero in *Tusculan Disputations* said: "There is still some distinction between labor and pain. On one hand, labor refers to the consumption of mental or physical power in work, or a duty that is stricter than usual; on the other hand, pain is an unpleasant movement of the body, and an annoying emotion" (Cicero, 45 BCE/2021, p. 79). From this we can see that labor includes both mental and physical labor expenditure. Moreover, not only in English but in various other European languages, "labor" refers not only to drudgery but also has the meaning of pain caused by childbirth (Arendt, 2007, p. 144). Evidently, in Western discourse, the verb "labor" refers to heavy physical labor and contains negative meanings like toil and pain. However, overall, Western labor concepts were equally complex, with both aspects praising labor and aspects looking down on labor. In the Homeric era, the word labor had mythological overtones, with labor originating as divine punishment. In *Works and Days*, labor was Zeus's revenge on humanity. Due to Prometheus stealing fire and successfully deceiving Zeus by allocating bones to the gods and beef to humans, Zeus used labor as content of revenge against humans. Although labor was divine punishment for humans, in Hesiod's view, labor not only could obtain wealth and thus avoid hunger, but could also receive divine favor. Therefore, he believed that labor was sacred and sublime, labor was not shameful, laziness was shameful (Hesiod, ca. 700 BCE/1997, p. 10).

In ancient Greek times, the term physical labor was highly pejorative at the time, and we would only see such work praised in very rare cases (Theocarakis, 2010, pp. 7-37). Due to the widespread use of slaves and development of commerce, nobles gradually no longer condescended to engage in labor, and labor was almost restricted to the slave class and viewed as menial work that humans had to do unwillingly for survival. At this stage, agricultural labor was viewed as one of the noble professions, not only strengthening physique but also shaping good citizens, thus befitting citizen status. Therefore, except for agricultural workers, groups such as slaves (working for others), craftsmen (daily labor damaging body and soul), and merchants (excessive pursuit of wealth) were all despised. Plato made positive analogies with skilled craftsmen many times, but in his own value hierarchy system, he ranked handicraft skills very low (Finley, 1973/2021, p. 115). In Aristotle's view, leisure was higher than labor. Slaves, craftsmen and other physical laborers did not have leisure, only upper-class nobles who did not engage in labor were qualified to have leisure to engage in political life. The nature of slaves made them unable to be independent and self-sufficient (Aristotle, ca. 350 BCE/2011a, p. 190), they were strong and suitable for labor, and not suitable for political life. Although Aristotle acknowledged that craftsmen and servants were needed for the polis, he also pointed out that they were merely "menial workers necessary to maintain polis life" and should not be made citizens of the polis (Aristotle, ca.



350 BCE/2011b, p. 130). Evidently, except for engaging in agricultural labor and political activities, other labor activities were all viewed as lowly activities.

In the Middle Ages, labor was a religious concept. In *Genesis*, "labor" was God's punishment for humanity. God created Adam from dust, not only placed him in the Garden of Eden, but also prepared work for him (Kuang, 2010, p. 183). Later, God also prepared a companion for Adam - Eve. Because Adam and Eve ate the fruit of knowledge of good and evil under the snake's temptation, God punished all three separately. Among them, God said to Adam: "...cursed is the ground because of you; through painful toil you will eat food from it all the days of your life", "By the sweat of your brow you will eat your food until you return to the ground..". (Kuang, 2010, p. 267). This meant that man must toil all his life and work desperately to survive. Since then, "labor" in the Middle Ages was viewed as God's punishment for humanity, one way for humans to atone for sin, closely related to meanings of toil and fatigue. Additionally, before "labor" became a form of punishment, God had already arranged labor for humans in the Garden of Eden, therefore, from another perspective, "labor" was a duty God bestowed upon humanity, connecting humans with God. This laid the foundation for the positive turn of labor concept's negative connotations.

In summary, the concept of labor has been associated with "original sin", "redemption", "toil", and "lowliness" since ancient Greece. It wasn't until the Middle Ages that the concept of "labor" began to gradually shift toward positive meaning. From the 16th century onward, driven by Martin Luther and Calvin's religious reforms, labor's status gradually improved. Labor became a sacred divine profession bestowed by God upon humanity - actively engaging in labor meant obeying God's calling, thus labor became humanity's divine calling with sacred significance.

2.2 The Labor Concept in the Industrial Revolution Era

During the Industrial Revolution period, traditional agricultural labor, household handicraft labor, and workshop labor transformed into factory labor. At this time, labor forms were mainly physical labor. Marx's examination of the "collective worker" also mainly focused on physical labor. With the establishment of division of labor and capitalist mode of production, workers sold their labor power as a commodity to capitalists, and laborers became part of the assembly line, engaging in unified, specialized work. Meanwhile, labor was no longer self-sufficient but produced for exchange purposes to obtain income by producing for others. In the labor process, laborers possessed, controlled and used labor materials but could not autonomously face labor products, suffering cruel exploitation from capitalists, and labor alienation occurred. Workers' creativity and individuality were suppressed, and labor became mechanized and an external compulsory activity.

Adam Smith developed the labor theory of value, promoting the transformation of the "labor" concept into an economic category. William Petty proposed that "the value of all things should be measured by land or labor" (Petty, 1662/2010, pp. 39-40). Building on this foundation, Smith systematically expounded his labor theory of value. First, Smith acknowledged that labor determines value, pointing out that "labor is the real measure of the exchangeable value of all commodities. The real price of everything, what everything really costs to the man who wants to acquire it, is the toil and trouble of acquiring it" (Smith, 1776/2007, pp. 70-71). "Labor is the only universal and accurate measure of value, that is, labor is the only standard by which we can compare the values of different commodities at all times and places" (Smith, 1776/2007, pp. 86-87). Second, Smith pointed out that in any society, the price of commodities consists of wages, rent, and profit, or one of these. Third, Smith initially distinguished between productive and unproductive labor as well as simple and complex labor.

Regarding productive and unproductive labor, Smith observed that although both involved labor, their effects on wealth accumulation differed. The labor of hired workers could bring wealth to employers, while servants' labor could only maintain employers' survival and life, unable to bring additional wealth; conversely, employers needed to spend part of their wealth to maintain servants' labor. Thus, Smith termed labor that acts on objects and can increase their value as productive labor, while labor that does not increase value as unproductive labor (Smith, 1776/2007, pp. 724-725). Regarding simple and complex labor, he believed that if one type of labor was more arduous and required more skill and intelligence than another, the products of the former would have higher value. In one hour, products of more arduous labor could be exchanged for twice the products of less arduous labor (Smith, 1776/2007, pp. 110-111). It can be said that since Petty proposed that labor determines value, the labor theory of value began to emerge and was further developed through Smith's exposition. Subsequently, David Ricardo inherited and developed Adam Smith's labor theory of value, initially laying the foundation for the labor theory of value.

From this point, labor in classical political economics was viewed as the measure of all commodity exchange values, meaning labor determines value and is also the source of all social wealth creation. From this point, the value of labor gradually gained recognition, and its status also progressively improved.



Hegel studied the labor concept from a philosophical category, elevating the labor concept from political economics to a philosophical level, proposing that "labor creates human self-consciousness". He believed human labor fundamentally differed from animal labor: animals satisfy their survival needs based on instinctive desires by destroying natural objects to maintain their lives; humans objectify themselves in products through labor, not only creating connections between humans and nature, humans and humans, but also realizing human power itself. On one hand, Hegel believed labor was an activity where humans, under the influence of needs and will, based on division of labor using tools to eliminate the in-itself nature of objects, thereby creating items that satisfy both their own needs and others' needs. In this process, private labor transforms into social labor through exchange. Therefore, labor is also a social activity, an activity that maintains relationships between people. On the other hand, Hegel pointed out that "labor is restricted or regulated desire, that is, delayed satisfaction of disappearance, in other words, labor cultivates things" (Hegel, 1807/1997, p. 130).

The master places the slave between himself and objects, requiring the slave to process and transform objects, while the master enjoys the slave's labor fruits, thus successfully satisfying the master's material desires. However, the master, by relying on the slave's labor for survival, conversely becomes dependent on the slave's position. "Before the master, the slave feels that being-for-self is only external or irrelevant to himself; in fear he feels that being-for-self is only potential; in cultivating things through labor, being-for-self becomes his own, and he begins to realize that he himself exists in-and-for-itself" (Hegel, 1807/1997, p. 131). In other words, the slave originally believed self-consciousness did not belong to himself but only to the master; through fear of death and the supreme master, and through the labor process, the slave's suppressed self-consciousness gradually awakens, transforming from possibility to reality. In particular, through labor, the slave becomes aware of his labor's survival value for the master and his own position as a slave, realizing his own existence as independence. Thus, we can see the importance of fear and labor, especially labor, in the slave's realization of his being-for-self existence. Overall, in Hegel's view, labor cultivates things, and humans can achieve self-consciousness awakening through labor. Marx critically developed Hegel's view of labor, arguing that labor is neither abstract spiritual activity nor sensuous intuition or profit-seeking activity, but rather a sensuous objectifying social activity, an objectification of human consciousness, also humanity's unique life activity, the fundamental distinction between humans and animals. "As soon as humans begin to produce their means of subsistence, taking this step determined by their physical organization, humans begin to distinguish themselves from animals" (Marx & Engels, 2009, p. 519). In this process, humans not only produce the necessities of life for their survival but also indirectly produce their real life itself, including material civilization, spiritual civilization, etc. Animals produce only for survival, while humans are different; humans know how to produce according to "aesthetic measures", that is, according to principles unifying regularity and purposefulness. Therefore, Marx identified purposeful, conscious productive labor as the fundamental distinction between humans and animals.

Moreover, labor is not only the foundation of human society's existence and development but also the driving force of human historical development. In the labor process, not only is the relationship between humans and nature formed, but relationships between people are also created, that is, social relationships are formed in the process of productive labor and communication. With the further development of labor productivity, the application of large-scale industrial production modes and universal communication ultimately promote the formation of world history. From this point, the contradictory movement between productive forces and relations of production unfolds and runs throughout human social development. Among these, the continuous transformation of productive labor methods drives the improvement of labor productivity, continuously promoting the evolution of human forms: primitive society, slave society, feudal society, capitalist society, and future communist society. Therefore, Marx pointed out that "the entire so-called history is nothing but

the process of human birth through human labor" (Marx & Engels, 1979, p. 131).

Furthermore, labor is the manifestation of human essence, the embodiment of autonomy and creativity. "Labor is first of all a process between human and nature, a process by which human, through their own activity, mediate, regulate and control the material exchanges between themselves and nature" (Marx & Engels, 2009, p. 107), "it is human's becoming for themselves within the sphere of alienation or as alienated humans" (Marx & Engels, 2009, p. 205), it is a material objectifying activity where real humans recognize and transform the objective world and create products to satisfy their own needs. In this process, humans externalize their essential powers in the objective world, confirm their own existence, affirm themselves, and fully develop their talents. Meanwhile, while transforming the external world, they are also changing themselves. Therefore, labor is also the process of human self-becoming, development, and transcendence. In short, labor is human's species-essence, the manifestation of autonomy and creativity.

However, under the capitalist system, laborers sell their labor power to capital, labor is no longer the manifestation of human essential power, namely subjectivity and autonomy, but becomes alienated. Regarding this, Marx critically analyzed alienated labor at the philosophical level, pointing out the connotations of alienated labor: First, humans are alienated from their labor products. Labor products should be the objectification of human labor, the manifestation of human essential power. However, under capitalist conditions, labor products become an alien force opposing workers; the more workers produce, the poorer they become. Second, humans are



alienated from their labor activity. Humans do not affirm themselves in labor but deny themselves. Third, humans are alienated from their species-essence. Labor is no longer the manifestation of human essence but becomes a means for wage workers to maintain survival. Fourth, humans are alienated from humans. In this process, a seemingly equal but essentially unequal wage labor relationship - oppression and exploitation - is formed and produces two opposing classes - bourgeoisie and proletariat.

Marx profoundly expounded the labor theory of value and pushed it toward maturity. Building on the foundation that labor determines value, Marx further questioned what kind of labor creates value, why and how it creates value, and established the dual nature of labor, pointing out that concrete labor and abstract labor are two sides of the same coin. Concrete labor forms the use value of commodities, it is mainly productive activity using natural materials as means of production, expressing the relationship between humans and nature; abstract labor forms the value of commodities. That is, the dual nature of labor determines the two factors of commodities - commodities have both use value and value properties. Regarding Smith's view that commodity value originates from rent, profit and wages or one of these, Marx took a critical stance. Smith confused wages with labor power value, thus believing surplus value like rent and profit came from land and capital, viewing the source of surplus value as wages, rent and profit. Marx pointed out that wages are only part of the value created by workers' labor, the true source of commodity value is labor, further speaking it is the crystallization of general human labor, determined by the socially necessary labor time spent in the labor process.

Meanwhile, Marx deeply analyzed the capitalist mode of production, revealing the secret of capitalist exploitation and labor's key role in capital appreciation. He pointed out that labor power as a special commodity is the prerequisite for surplus value production, the value created by workers exceeding the compensation for labor power value and appropriated by capitalists without compensation, that is, the crystallization of workers' surplus labor, is the source of surplus value. This directly pointed out that capital appreciation is achieved based on exploiting and squeezing workers. Specifically, under capitalist wage conditions, wage workers suffer both physical and mental torture in labor, at this time labor is not a free and unrestrained activity, but work that makes people feel pain and depression wanting to escape. "Labor is external to the worker, that is, does not belong to his essence; therefore, he does not affirm himself in his labor, but denies himself" (Marx & Engels, 2009, p. 159).

Free labor is Marx's ideal form of labor, and also the sublation of alienated labor. Marx pointed out that alienated labor makes people lose their human essence, only in the communist period can people be liberated from labor. By then, public ownership of means of production determines that all members of society jointly possess and use means of production, jointly possess labor products. The purpose of production also undergoes fundamental change, no longer endlessly extracting surplus value in pursuit of high profits. Meanwhile, division of labor no longer has compulsory and oppressive nature, "no one has a special sphere of activity, but everyone can develop in any department" (Marx & Engels, 2009, p. 537), people can freely and equally choose division of labor based on their interests and talents, engaging in various creative activities. By then, labor not only becomes life's first necessity but also an extremely serious and intense self-realization activity, where people not only demonstrate their talents in labor but also gain self-confirmation in labor. In short, in communist society, humans will end the history of slave-like submission to compulsory division of labor, labor not only sheds its nature of making a living, no longer becoming a heavy burden, but becomes a free and unrestrained activity, fully manifesting human subjectivity.

In summary, Marx's analysis of the labor concept mainly manifests in several aspects: On one hand, labor is not only the distinction between humans and animals but also the foundation of human society and historical existence and development, and more importantly the manifestation of human species-essence. However, due to the emergence of private ownership, labor became alienated. On the other hand, labor is also the source of value; surplus labor under capital employment is the source of creating surplus value. Marx's labor concept is both an affirmation of labor value and a transcendence of past value concepts that devalued labor. Before the Industrial Revolution, labor forms were mainly manual operations, with relatively low labor productivity. During the Industrial Revolution, with the application of machines, labor demonstrated huge economic benefits. Relying on mechanized mass production and division of labor, labor productivity was greatly improved. Marx pointed out: "What distinguishes different economic epochs is not what is produced, but how it is produced, by what labor means it is produced" (Marx & Engels, 2009, p. 210). The advancement of labor tools significantly improved labor productivity and created massive social wealth, that is, the economic value of labor gradually emerged, and from this point the value of labor gradually gained social attention and recognition.

3. NEW INTERPRETATION OF LABOR CONNOTATION IN THE AI ERA

3.1 New Connotations of Labor

Under the drive of the digital revolution characterized by digitalization and intelligence, the digital economy has become a new economic form following the Industrial Revolution. The development of digital technology is gradually changing people's ways of life and production; labor breaks through spatial constraints, and the boundaries between work and life are increasingly blurring. Meanwhile,



labor forms have undergone significant changes: from mainly physical labor to mainly mental labor. Artificial intelligence, cloud computing, blockchain and other digital technologies are increasingly crucial in productive labor, and have given birth to new labor forms - digital labor. Currently, domestic and international academia have different views on the concept of "Digital Labor".

Terranova Tiziana first proposed "digital labor", pointing out that "free labor on the net is voluntarily given and unwaged, enjoyed and exploited, including building websites, modifying software packages, reading and participating in mailing lists, and building virtual spaces in MUDs and MOOs" (Terranova, 2000, pp. 33-58). In other words, whether internet users' purposeful behavior of building virtual spaces or voluntary, unpaid labor are manifestations of digital labor. Christian Fuchs pointed out that internet users "are both consumers of information and prosumers - productive consumers", "all forms of paid and unpaid labor required for the existence, production, dissemination and use of digital media should be included in the scope of 'digital labor'" (Fuchs, 2014, pp. 280, 296).

Currently, domestic academia has three different views on the definition of digital labor mainly centered around "whether prosumer labor is digital labor" (Shi, 2021, pp. 15-23). As Marx said: "What distinguishes the worst architect from the best of bees is this, that the architect raises his structure in imagination before he erects it in reality". Furthermore, "the simple elements of the labor process are: purposeful activity or labor itself, the object of labor, and the means of labor" (Marx & Engels, 2009, p. 208). "The essence of the labor process lies in productive useful labor creating use values" (Marx & Engels, 2009, p. 227). Regarding this, digital labor is defined as activity where laborers use digital technology tools to transform traditional production materials or digital production materials "to make predetermined changes to labor objects" (Marx & Engels, 2009, p. 211), producing digital products or services with use value. While the data generated from internet users' browsing, sharing, shopping and various activities is not only fragmented and chaotic but also not the main purpose of users going online, this chaotic raw data needs to be collected, analyzed and developed by data collectors, data analysts and data engineers to produce products with use value. In essence, whether from labor's purpose or labor's results, internet users' clicking, browsing and sharing behaviors should be viewed as activities, not labor.

Evidently, in the AI era, labor means and labor objects have undergone new changes, requiring reinterpretation and understanding of "labor".

Firstly, workers' autonomy and flexibility in labor have increased. In the digital economy era, with the development of cloud computing technology, labor tools are increasingly becoming digital and cloud-based. The application of digital platforms breaks the physical space limitations of labor, making the labor process highly elastic and flexible. Workers who master advanced scientific and technological knowledge and possess digital skills can use cloud service platforms to achieve cross-regional online document editing and video conferencing. To some extent, workers can freely and autonomously choose when, where, and how to work for whom. In essence, labor is no longer limited to specific times and places, becoming more flexible. Additionally, workers change their subjective world while transforming the objective world. Workers can engage in creative activities with the help of generative AI, enhancing the creativity of intelligent labor.

Secondly, labor means are becoming increasingly intelligent, digital, and green. Labor tools, as extensions of human body organs, play an important role in labor production and occupy a central position in labor means. Labor tools evolved from stone tools, bronze to iron tools in the agricultural age, from manual operation machinery, mechanical tools, electric mechanical tools to automated mechanical tools until contemporary digital intelligent tools in the industrial age (Feng & Shen, 2024, pp. 3-17). The application of machines not only enhanced humanity's ability to conquer nature but also increased demands on natural resources, thus while the Industrial Revolution brought massive increases in social wealth, it also caused serious environmental damage (Qi, 2024, pp. 77-82). Today, labor tools are innovating and upgrading toward digitalization, intelligence, and integration. These tools not only possess high productivity but are also environmentally friendly, paying more attention to green production. On one hand, platform-based labor means based on big data, cloud computing, and other technologies can improve capabilities in data collection, processing, training, and iteration, thereby promoting further concentration of means of production. Digital platforms can not only achieve intelligent data analysis and real-time sharing, enhancing data accuracy and real-time performance, but also provide application scenario foundations for intelligent decision-making. On the other hand, intelligent production means rely on the application of intelligent algorithms, robots, and visual recognition systems to achieve precise control, online detection, and efficient production of the production process. Compared to traditional machines, intelligent robots act more nimbly and flexibly. For example, industrial robots like welding robots and assembly robots, although appearing as mechanical arms or legs, move agilely and can complete precise grasping tasks under pre-input code instructions, and with the enhancement of visual recognition systems, can achieve 24-hour uninterrupted automated, process-oriented, and efficient production. Thirdly, the types and forms of labor objects continue to expand. Technological progress has enhanced humanity's ability to understand and transform the world, improving the breadth and depth of opening up, utilizing, and creating resources. More new labor objects are being excavated, created, and incorporated into the scope of labor objects, weakening resource scarcity's constraints on development. Specifically, new resources substitute originally scarce resources and enable full utilization of resources that were previously



inefficiently used due to technological limitations. This means originally scarce resources find new substitutable resources, and previously inefficiently used resources can be fully and efficiently utilized, to some extent helping alleviate resource bottlenecks in economic development. Labor objects have transformed from traditional physical forms to virtual forms. Currently, data has become another important new production factor following land, labor, capital, and information technology. The importance of data factors is increasingly prominent in the intelligent era, and the breadth and depth of data development and utilization are becoming core elements of enterprise competition. Among these, data factors have characteristics of openness, shareability, and non-depletion. First, data sources are broad and diverse, with any information potentially becoming an object of data collection. Thus, workers mine and integrate raw data, transforming chaotic and disorderly data into valuable data, thereby supporting digital product production. Second, data can be commonly used across time and space by multiple subjects. Unlike the exclusivity of materialized means of production, data can be shared in real-time through networks, and its value increases with the degree of sharing. Third, data can be reused without affecting its use value. Unlike traditional production factors, data factors are not consumed one-time after participating in the transfer of old value and creation of new value in the labor process, but can still be repeatedly used after use; moreover, with the increase in platform users, platform data will produce cumulative effects. For instance, databases that store and manage data not only contain large amounts of text, images, and video information that can be used multiple times, but also continuously integrate and iterate based on deep learning. In summary, under the digital wave, means of production are further concentrated and promote the socialization of production, with collaboration becoming more extensive and division of labor more detailed. Workers have transformed from direct actors on production objects to operators of intelligent devices indirectly participating in productive labor, showing a phenomenon of "human-machine collaboration". Meanwhile, with the digitalization and intelligence of means of production and labor objects, the mode of labor production also shows intelligence and digitalization. Intelligent production equipment is deeply embedded in production, logistics, and other links. Particularly, the application of intelligent machines reduces the demand for worker numbers, showing characteristics of "unmanned" and "de-humanized" labor processes.

3.2 New Changes in the Labor Market

Technological progress is a "double-edged sword" for the labor market. During the Industrial Revolution, on one hand, the increase in technological factor inputs promoted the advancement of production machines. Mechanized production could effectively optimize resource allocation and improve production efficiency, allowing production workshops to complete production operations with only a small number of personnel, thereby reducing the demand for human factors. On the other hand, the emergence of steam engines, internal combustion engines, and generators promoted the development of industries such as textile, coal, oil, automobiles, and aircraft, creating new employment positions absorbing large amounts of labor force.

From 2023, about 75% of companies hope to adopt technologies such as big data, cloud computing, and artificial intelligence in the next five years (WEF, 2023a). As AI technology gradually applies to manufacturing, healthcare, transportation, and other fields, the labor employment market will undergo important reforms, not only increasingly emphasizing workers' creativity, technological literacy, and other qualities but also significantly impacting workers' income.

First, the application of artificial intelligence has both negative employment substitution effects and positive employment compensation effects on the labor market. On one hand, AI technology is gradually replacing simple, repetitive or mechanical, laborious physical labor as well as simple, non-creative mental labor on a large scale. Most domestic and international scholars believe that AI technology's substitution effect is low for high-skilled and low-skilled workers, but has a greater impact on medium-skilled workers (Wang, 2023, pp. 39-55). Driven by digitalization and automation, by 2027, record-keeping and administrative work positions will decrease by 26 million (WEF, 2023b). Although some of these positions require relevant work experience, they are now being replaced by artificial intelligence built on iterative technology of large language models. In this process, some workers may undergo re-education or training to improve their abilities to adapt to new position requirements, but some workers may face short-term unemployment due to lacking professional qualifications for high-skilled labor positions. However, this does not mean that artificial intelligence's employment substitution effects are all negative. Intelligent robots can engage in some dangerous, heavy, or assembly line positions that humans cannot or are unwilling to engage in, such as high-temperature or highly corrosive environments, thereby extending and amplifying human physical organs or compensating for human physiological limitations or deficiencies. Therefore, this substitution can not only fill vacancies in some work positions but also help liberate humans from dangerous, heavy, or monotonous boring work positions.

On the other hand, the application of artificial intelligence will give birth to new business forms and industries, thereby creating new employment positions absorbing labor force. On April 1, 2019, the Ministry of Human Resources and Social Security, State Administration for Market Regulation, and National Bureau of Statistics released information on 13 new occupations including artificial intelligence engineering technicians and big data engineering technicians, these positions derived from China's industrial structure transformation and upgrading driven by AI, Internet of Things, and big data technologies (Ministry of Human Resources and Social



Security et al., 2019). With the development of artificial intelligence technology, future global labor market demand for artificial intelligence and machine learning experts is expected to increase by 40%, that is, 1 million job positions. China's growth demand for employment positions such as data analysts and scientists, big data experts, business intelligence analysts, database and network professionals, and data engineers will approach 45% (WEF, 2023c). Therefore, with the development and application of AI technology, the labor market still has a huge shortage of high-tech professionals, and artificial intelligence talent demand covers multiple fields including computer vision and natural language processing.

Second, with the transformation of employment positions, labor skill structures and workers' income will also undergo corresponding changes. On one hand, with the application of AI technology and the increasing intelligence and automation of labor processes, workers' technological literacy, creative thinking, analytical thinking, and lifelong learning abilities are becoming increasingly important in the labor market; workers' operational skills are declining in status in the labor market. Therefore, workers should strengthen their vocational skills training and education, through which artificial intelligence may become an opportunity rather than a threat. On the other hand, artificial intelligence's crowding-out effect and creation effect are beneficial for high-income groups' stable employment, while low-income groups' unemployment problems become more serious, changing the labor force employment structure and widening the income gap between different skilled labor forces (Jiang & Zhang, 2021, pp. 58-68). The widening of labor income gaps will hinder the improvement of residents' consumption levels and living standards, and is more unfavorable to achieving the goal of common prosperity. This requires joint efforts from workers, enterprises, and the state to adjust.

Evidently, the application of artificial intelligence technology has impacted the labor employment market, workers' skill requirements, and income. China's *Digital Literacy and Skills Development Level Survey Report (2024)* shows that Chinese workers' ability to adapt to career development needs in the digital era is gradually strengthening, and citizens' digital literacy and skills improve with education levels (Cyberspace Administration of China, 2024). Although the application of artificial intelligence technology will cause some positions to decrease and pose threats of skill obsolescence, workers' employment positions are not simply replaced by artificial intelligence technology. When workers adapt to high-tech position work requirements through re-education and training, employment substitution transforms more into occupational transformation.

3.3 From Traditional Skills to Digital Skills

Technological progress and its deep integration with labor production promote continuous reform of production modes. Before the Industrial Revolution, workers' labor was an activity of simple physical labor using tools based on division of labor. After the Industrial Revolution, with the popularization of factory machinery and equipment, workers gradually transformed from direct actors on labor objects to supervisors and regulators of the production process. As Marx said: "Labor no longer appears as being included in the production process; rather, the human being comes to relate more as watchman and regulator to the production process itself" (Marx & Engels, 2009, p. 196).

In the AI era, as production machines become increasingly intelligent and digital, mass assembly line production methods are being replaced by intelligent, platform-based, and virtual production methods. Some simple physical and mental labor will gradually be replaced by intelligent machines, while the importance of innovative mental labor becomes increasingly prominent.

The intelligent era is in the process of iterating from traditional skills to digital skills. The agricultural age required high physical abilities from workers. Entering industrial society, on one hand, it emphasized workers' physical labor, requiring them to possess simple skills that could endure high-intensity single repetition on assembly lines; on the other hand, it also highlighted workers' complex mental labor, emphasizing technological literacy and innovation ability, generally requiring workers to "simultaneously exercise both physical and mental capabilities". Now in the intelligent economy era, society has higher requirements for workers' labor skills. First, with society's increasing demand for artificial intelligence technology and its applications, society's need for high-skilled workers who master digital technology and skillfully use digital tools has surged, such as AI software development and AI compiler development engineers. Therefore, it is particularly important in the intelligent era for workers to master digital skills, especially knowledge and skills related to computer programming and artificial intelligence. Second, as "human-machine collaboration" becomes a new way of working, workers' collaboration abilities are also increasingly important. Workers not only need to master basic operational skills but also need to master knowledge and technology in machine debugging, intelligent system operation, and maintenance.

It can be said that under the digital economy wave, society needs more high-quality compound workers, requiring them to master digital skills related to programming, data analysis and application, while also requiring high innovative thinking, communication skills, and management abilities. Therefore, in the rapidly changing artificial intelligence era, workers' creativity, digital literacy, and skills become increasingly important.



4. NEW THOUGHTS ON LABOR VALUE IN THE ARTIFICIAL INTELLIGENCE ERA

4.1 Challenges to Traditional Labor Value Theory in the AI Era

Currently, with the advancement of a new round of technological revolution, production methods are advancing toward networking, digitalization, and intelligence. While artificial intelligence promotes industrial transformation and drives economic development, traditional labor value theory also faces many new problems and challenges, including views on "diversification of value creation sources", "artificial intelligence replacing humans to occupy the main position of labor", and "technological progress leading to unemployment".

1. Whether Artificial Intelligence Creates Value

In the AI era, the application of intelligent technology has given birth to automated production systems such as digital workshops, producing phenomena where large numbers of production workers "exit" from factories yet bring multiplied enterprise profits. This demonstrates productivity beyond traditional technology, again raising questions about traditional labor value theory regarding labor creating value. In digital workshops, the application of AI technology only adjusts the ratio between variable capital and constant capital, that is, the adjustment of input proportions within capital's technical organic composition, without changing the fact that machines and intelligent machines belong to the category of constant capital, namely materialized labor. They can only transfer their own value gradually to new products when combined with human living labor acting on labor objects, but do not create value. Furthermore, high enterprise profits are not created solely by intelligent equipment or merely by workers giving commands. In short, AI technology can assist humans in understanding the world, creating the world, and creating enormous social wealth, but in essence, it is a technological existence, an extension and supplement to human intelligence; it cannot create value.

1. Whether Artificial Intelligence Impacts Humans' Status as Labor Subject

The application of AI technology, especially the emergence of unmanned factories, makes workers' living labor's value creation method more concealed, mistakenly believing that intelligent machines replace humans and occupy the entire production process, thereby denying workers' subjectivity in the labor process. Currently, although artificial intelligence demonstrates amazing computational ability, logical reasoning ability, learning ability, etc., and conducts autonomous actions under instructions, "possessing", "controlling", and "acting upon" labor means in the labor process, it first cannot be separated from engineers' preliminary labor, and its labor tasks cannot be separated from human settings. Additionally, artificial intelligence's "creativity" does not possess emotions and experiences unique to humans but is based on algorithms and rules. In short, it does not possess self-consciousness and self-thinking, cannot possess true purposefulness and creativity, and its subjectivity has essential differences from human subjectivity. Artificial intelligence essentially remains the externalization and embodiment of human will and creativity.

1. Whether Workers Become a Useless Class

The development and application of artificial intelligence replaces human labor in many positions causing some workers' unemployment problems, which again raises discussions about "useless class" and "income inequality". The application of artificial intelligence brings unprecedented challenges to human labor rights. However, "unmanned workshops" are not truly unmanned; behind them are large numbers of technical research and development and control personnel. The operation of intelligent machines cannot be separated from the labor of the high digital-skilled working class. Moreover, the application of AI technology is giving birth to new positions such as intelligent research and development and machine programming, which will create demand for related high-skilled labor force with scientific and technological literacy and digital skills, prompting workers to continuously improve their labor quality to achieve "re-skilling". Therefore, artificial intelligence will not cause the working class to become a "useless class". Facing the phenomenon of social income inequality with technological progress, we need to be vigilant about capital's profit-seeking nature, regulate and guide healthy capital development, promote artificial intelligence development toward "good", and improve relevant policies to ensure workers' "reproduction" and achieve a more equitable wealth distribution mechanism.

In the artificial intelligence era, humans' living labor being the only source of value has not changed, workers' status as labor subjects has not changed and will not become a "useless class". What has changed is that technological elements represented by artificial intelligence are increasingly prominent in production, especially when embedded in the production process to optimize resource allocation, releasing enormous productive forces.

4.2 New Interpretation of Labor Concept in the Artificial Intelligence Era

Humanity is currently entering the Fourth Industrial Revolution represented by artificial intelligence and other new technologies. The principle of intelligent machines' application in improving production efficiency and economic benefits has similarities with traditional technology. AI technology can stimulate workers' imagination and creativity to a greater extent. The application of AI technology enables "AI + small labor input" to achieve enormous productivity. Specifically, the application of AI technology optimizes the labor force structure, with small labor input producing efficient productivity. As Marx said: "The creation of real wealth comes to depend less on labor time and on the amount of labor employed than on the power of the agencies set in motion during labor time, whose powerful



effectiveness is itself in turn out of all proportion to the direct labor time spent on their production, but depends rather on the general state of science and on the progress of technology, or the application of this science to production" (Marx & Engels, 2009, pp. 195-196). Productive force is the ability to transform nature formed by combining people with labor capacity and means of production (Wu & Yu, 2020, pp. 36-45). The combination of new intelligent workers and advanced means of production will promote the improvement of productive forces. Supported by algorithms and computing power, artificial intelligence can store massive data, demonstrating super memory and networked search summarization capabilities. Through intelligent analysis, artificial intelligence can quickly and efficiently analyze and process data according to human requirements, thereby providing optimal solutions for humans. These solutions can provide useful reference for humans to understand and transform the world, maximizing the stimulation of human imagination and creativity, bringing leaps in economic benefits.

Furthermore, as an important engine of new productive forces, AI technology has great potential in improving labor productivity and promoting economic growth. The application of AI technology has led to new changes in how workers combine with means of production, showing "unmanned" characteristics. In agriculture, based on data collected by cloud platforms such as humidity, temperature, light intensity, and relying on BeiDou Navigation System, 5G technology, and AI recognition, it achieves all-weather real-time monitoring of farmland environments and high-precision, unmanned operations in plowing, planting, management, and harvesting through drones. It can even break away from the farmland environment, relying on fully intelligent control systems to achieve systematic planting, realizing industrial streamlined production without requiring sunlight and soil. Relying on AI technology is gradually realizing smart farming, and the application of "unmanned farms" and "unmanned plant factories" is gradually enabling workers to break away from harsh labor environments, achieving remote labor operations indoors through intelligent systems. In manufacturing, "lights-out factories" utilizing intelligent systems and robots have achieved unmanned or minimal-staffed labor, with the entire labor process showing de-humanization characteristics. On one hand, using cloud computing and big data technologies can efficiently integrate resources and optimize production processes, achieving completely unmanned operations throughout the entire production process. Production workshops only need a few intelligent robots to achieve efficient production. Additionally, generative AI can significantly improve the accuracy of identifying and correcting defects while reducing machine operation downtime. When intelligent equipment operation is interrupted, technical personnel can quickly locate and solve problems under the guidance and advice provided by AI large model intelligent Q&A systems, thereby improving workplace safety and reliability. On the other hand, AI technology has achieved harmony between economic and ecological benefits. Traditional technology had high demands for resources like coal and oil. For example, the application of steam engines brought about massive increases in social wealth for Western countries while also causing serious environmental pollution.

AI technology can promote research and development of new technologies and products, optimize resource allocation, thereby improving total factor productivity and promoting green economic development. Additionally, data as a new production factor plays an important role in intelligent production along with factors like knowledge and information. Its replicability, shareability, and other characteristics reduce human dependence on natural resources, making virtual production or virtual products possible, thereby reducing raw material use and waste. Therefore, AI technology reduces negative impacts on resources and environment while improving labor productivity. In the service industry, AI technology may cure the "Baumol's disease" of the service sector (Li, 2023, pp. 48-53), becoming an engine of economic development. In customer service, applying generative AI can improve problem-solving efficiency by an average of 14% when measured by problems solved per hour (Brynjolfsson & Li, 2023). Generative AI can not only automatically execute tasks and efficiently handle large amounts of repetitive tasks, but also integrate and analyze databases, formulate market plans, provide personalized marketing and services, improving service quality while reducing errors and operating costs. In healthcare, AI algorithms and deep learning technology can manage medical records, achieve medical image analysis, and make clinical diagnoses. In summary, the development of artificial intelligence not only changes labor methods and social division and cooperation but also stimulates labor subjects' initiative and creativity. Compared to traditional technology, relying on cloud computing, deep learning, and other technologies, AI technology can gather massive data—concentrating historical and cultural information from around the world—and based on this, capture content to make judgments and decisions, providing planning solutions to assist human production and creation. This not only breaks through human brain memory capacity limitations but also surpasses human speed in extracting useful information from massive data, providing assistance for engaging in creative activities, achieving the goal of "low input-high output".

5. CONCLUSION

Artificial intelligence aims to achieve "human-like" goals by simulating human learning abilities, thinking abilities, and other capabilities, thereby becoming intelligent machines that can think and act like humans and serve human production and life. With the development of artificial intelligence, labor forms are undergoing new changes, with mental labor related to mathematical skills and creative activities becoming increasingly important. Understanding the evolution of labor concepts and interpreting new changes in labor and its impact on the labor force market in the intelligent era, adhering to the people-centered development concept, while



leveraging artificial intelligence's economic benefits, we should coordinate technological progress with social imbalance issues, promoting labor liberation and humans' free and comprehensive development.

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WOMEN ENTREPRENEURIAL DEVELOPMENT: A CASE STUDY OF WOMEN SELF-HELP GROUPS ENTREPRENEURS

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ABSTRACT

Women entrepreneurs in SHGs play a vital role in driving economic and social change. Their endeavors not only enhance their own lives but also contribute significantly to the well-being of their families and communities. This research paper delves into the transformative journey of women entrepreneurs within self-help groups (SHGs) and examines their profound impact on community development and economic growth. Through a meticulous analysis of secondary sources, including scholarly articles, government publications, and authentic websites, the study investigates the status, motivations, challenges, and achievements of women entrepreneurs in SHGs. The findings underscore the pivotal role of SHGs in empowering women entrepreneurs by providing microloans, training programs, and access to markets. These initiatives enable women to establish businesses, invest in various sectors, and support their families. Motivated by financial independence, community development, and personal growth, women entrepreneurs within SHGs navigate challenges such as societal norms, limited access to technology, and legal barriers. By addressing the challenges they face and providing tailored support, societies can harness the full potential of women entrepreneurs, fostering inclusive economic development and social progress.

KEYWORDS: Women Entrepreneurs, Self-Help Groups (SHGs), Women's empowerment, Community development, Economic growth, Financial independence, Microloans, Training programs

1. INTRODUCTION

Entrepreneurship is crucial in industrial development, with women entrepreneurs gaining prominence globally. Women's entrepreneurial development within self-help groups is a transformative process that not only empowers individual women but also fosters community development and economic growth. Self-help groups (SHGs) provide a supportive environment where women can collaborate, learn, and access resources to establish and expand their businesses.

Women, noted for their perseverance, patience, and communication abilities, are vital for rural success. They are, however, frequently less educated, economically disadvantaged, and geographically limited. Entrepreneurship can help rural women by giving them opportunities for self-employment. The Self Help Group (SHG) concept is a driving force for rural women, and the SHG-Bank linkage program is the world's largest microfinance program.[1]

SHGs play a crucial role in women's entrepreneurial development, particularly in developing countries. They provide financial autonomy, support networks, and skills for women to start and grow their businesses, contributing significantly to the socio-economic structure of a community

This case study investigates the role of self-help groups (SHGs) in fostering women's entrepreneurial growth, highlighting their transformative potential in promoting women's empowerment and economic development. It delves into motivational factors, performance metrics, and challenges faced by these women entrepreneurs, contributing to discussions on women's empowerment through entrepreneurial development

2. OBJECTIVE

- To assess the status of women entrepreneurs within self-help groups
- Analyze the performance of women self-help group entrepreneurs.
- To investigate the motivational factors driving women entrepreneurs to start their ventures
- Identifying the challenges experienced by women entrepreneurs in self-help groups



3. METHODOLOGY

The study made use of secondary sources to have comprehensive evidence-based research on women entrepreneurs development through self-help groups. Content analysis is based on observations from reputed journal articles, authentic websites, well-known books, popular reports, government publications, and articles from newspapers.

4. REVIEW OF LITERATURE

In Maja Schakenda Kaldahl's master thesis, completed in January 2016 at Copenhagen Business School, the focus is on exploring the link between the entrepreneurial process and women's empowerment, particularly in the context of women's self-help groups in India. The thesis investigates the role of entrepreneurship in women's Self-Help Groups (SHGs) in India, highlighting the complex link between microfinance and women's empowerment. A qualitative field study in West Bengal found that women's aspirations drive their entrepreneurial journey, leading to economic, cultural, and social empowerment. Understanding these aspirations is crucial for poverty alleviation efforts.[2]

Preeti Sharma and Shashi Kanta Varma in their research article Women Empowerment through Entrepreneurial Activities of Self-Help Groups emphasized Self Help Groups and entrepreneurial activities play a pivotal role in empowering rural women, fostering economic independence, social recognition, and confidence. By addressing challenges and creating supportive environments, these initiatives can further enhance the empowerment of rural women, paving the way for sustainable development and gender equality in rural communities [3]

A Study on Women Entrepreneurship Development and Entrepreneurial Behaviour among Self-Help Groups in Kanyakumari District by D. Andrew Scott, Associate Professor at Alagappa Government Arts College, investigates the effectiveness of Self-Help Groups (SHGs) as a catalyst for developing entrepreneurship among women. The research uses descriptive and analytical methodologies and focuses on 150 women entrepreneurs associated with SHGs in Kanyakumari district. The findings highlight the importance of nurturing entrepreneurial talent, crucial for sustaining a competitive advantage in the global economy driven by innovation. Enhancing entrepreneurial traits can increase the pool of potential and active entrepreneurs, generating more employment opportunities and contributing to national wealth creation.[4]

5. WOMEN ENTREPRENEURIAL DEVELOPMENT AND WOMEN SELF-HELP GROUPS CONCEPT

WOMEN ENTREPRENEURIAL DEVELOPMENT

Entrepreneurship is crucial for economic success and human resource advancement. Women are increasingly interested in entrepreneurship due to its opportunities, such as being their boss, overcoming obstacles, and potentially earning more than family duties. Technological advancements have empowered women, enabling them to acquire the necessary qualifications and skills for business. Tailored programs are needed to bridge the gap in self-employment initiatives, significantly promoting women's empowerment through entrepreneurship.[5]

Women entrepreneurs in India had a tremendous impact on the country on a variety of levels. They have grown into self-sufficient, robust, and financially progressive individuals, serving as policymakers, policy implementers, managers, and leaders. Their insight and calculated risks have propelled their companies forward. Women entrepreneurs have found success at the collective level through Self-Help Groups (SHGs), which have become effective vehicles for poverty eradication and upliftment. SHGs help rural women achieve financial independence by empowering them and cooperatively earning revenue. These organizations have made important contributions to the financial independence of rural women, positively impacting their lives. Women entrepreneurs are actively involved in nation-building endeavors as well as individual or group achievements.[6]

WOMEN SELF-HELP GROUPS

In developing nations like India, Self-Help Groups (SHGs) are essential for empowering women and advancing economic development. These micro businesses, which frequently rely on microloans from microfinance institutions (MFIs), increase purchasing power, create jobs, and bring in money. Rather than focusing solely on "mass production," the "masses approach" to manufacturing can solve macroeconomic issues like unemployment, poverty, and overpopulation. [7]

In addition to promoting economic and social transformation, Women's Self-Help Groups (SHGs) play a crucial role in women's holistic development. These groups unite women, pooling resources to achieve shared goals. Through teamwork, they foster a cooperative spirit, provide moral support, and provide essential cash support. SHGs also help break down barriers, build a strong sense of community, and instill confidence in women, fostering self-reliance, financial independence, and mutual empowerment.[8]

6. ABCD LISTING ANALYSIS

ABCD Analysis is a strategic tool used to assess various aspects of Women Entrepreneurial Development within Self-Help Groups (SHGs). This method categorizes factors into four groups: Advantages (A), Benefits (B), Constraints (C), and Disadvantages (D). Advantages (A) highlights the positive aspects, Benefits (B) focuses on the outcomes, Constraints (C) identifies



challenges, Disadvantages (D): points out risks. This analysis provides a comprehensive overview, aiding in understanding the complexities and potentials of women's entrepreneurial initiatives within SHGs.

ABCD analysis of women entrepreneurial development through self-help groups are as follows:

A (Advantages)

- Self-help groups offer low-interest microloans and credit facilities to women, enabling them to start and grow enterprises, investing in inventory, equipment, and marketing, thereby boosting business growth and sustainability.
- Women undergo entrepreneurial training programs to enhance their skills in financial management, marketing, and product diversification, while also enhancing their confidence, decision-making, resource allocation, and market positioning.
- Self-help organizations offer female entrepreneurs networking opportunities, enabling them to connect with clients, suppliers, and business partners, thereby expanding their market reach and boosting sales and revenue.
- Self-help organizations offer mentorship programs that connect experienced entrepreneurs with newcomers, offering guidance on market trends, risk management, and innovation, enabling informed business decisions.
- Successful female entrepreneurs invest in community development projects, improving local quality of life, generating social impact, and gaining support for female-led firms.
- Through fairs, exhibitions, and online platforms, self-help organizations enhance the visibility and recognition of women entrepreneurs, fostering customer trust, brand recognition, and business success.
- Government policies and initiatives promote women's entrepreneurship through self-help groups, while financial incentives and subsidies drive economic growth.
- Female self-help group members serve as role models, encouraging others to pursue their entrepreneurial dreams, challenging gender norms, and advocating for social change and equitable opportunities.

B (Benefits)

- Entrepreneurial success empowers women to achieve financial independence by significantly contributing to home expenses, saving, and making crucial financial decisions for their families.
- Entrepreneurship fosters skill development, enabling self-help group members to adapt to market changes and consumer preferences, thereby increasing competitiveness and staying current with technical advancements and managerial practices.
- Successful female entrepreneurs in self-help groups gain societal recognition, challenge gender norms, and challenge prejudices, boosting their self-esteem, encouraging them to contribute more, and inspiring others.
- When female entrepreneurs of self-help groups are successful, the unemployment rate is reduced because they provide new job opportunities for people in the community, which in turn boosts economic growth by encouraging local businesses to invest and support their growth.
- Entrepreneurship fosters creativity among women self-help group members by generating innovative ideas, products, and services to meet market demands, attracting customers, and gaining a competitive edge.
- Self-help groups provide women with skill development courses to enhance their industry knowledge, boost confidence, facilitate market competition, and explore new business opportunities.

C (Constraints)

- Time management techniques are crucial for women entrepreneurs who often face burnout due to balancing business responsibilities with caregiving and domestic tasks.
- Limited technology access can hinder women entrepreneurs of self-help groups from expanding their online reach, optimizing operations, and enhancing online marketing, e-commerce, and efficiency.
- Women entrepreneurs are frequently subjected to societal conventions and cultural restrictions that restrict their mobility, decision-making ability, and acceptance of non-traditional business roles.
- Due to their limited access to resources, need for collateral, and rigorous loan approval procedures, women entrepreneurs often encounter financial obstacles that prevent them from investing in larger-scale projects and growing their businesses.
- Market competition necessitates constant innovation and adaptability, which can be difficult for female entrepreneurs with minimal resources.
- Due to complicated business registration procedures, legal requirements, and a lack of knowledge about rules, women entrepreneurs confront legal and regulatory obstacles.
- The lack of mentorship options and professional networks for women entrepreneurs restricts their exposure to market trends, industry insights, and joint venture prospects.
- The absence of family support or social expectations that align with traditional gender roles can potentially hinder women's entrepreneurial endeavors.
- Work-life balance issues occur as women entrepreneurs devote significant time and effort to their firms.



D (Disadvantages)

- Entrepreneurship entails risks such as financial losses, market uncertainties, and business failures, especially for women entrepreneurs who may have difficulty accessing recovery resources.
- Limited financial resources can hinder female self-help entrepreneurs from investing in research, development, and innovation, which is crucial for market competitiveness and product or service launch.
- Market volatility can have a substantial impact on the sales and revenue of women-led firms, prompting the creation of adaptability strategies.
- The stress and extended work hours associated with entrepreneurship may potentially affect the physical and mental health of female entrepreneurs.
- Due to talent disparities, women-led enterprises may encounter difficulties in areas like digital marketing, technology adoption, and financial planning.
- The stigma and bias faced by women in business can lead to prejudice and hinder opportunities and support from stakeholders.

7. FINDINGS

- I. Self-help groups provide microloans and credit facilities to women entrepreneurs, enabling them to start businesses and invest in agriculture, handicrafts, and small-scale industries. They offer training programs, market access, and networking opportunities.
- II. Self-help groups empower women entrepreneurs by building confidence, improving communication, and encouraging leadership. They invest in community development projects, improving quality of life. Government initiatives support these groups through funding, training, and mentorship.
- III. Financial independence drives women entrepreneurs to start businesses, contributing to household expenses and securing futures. Entrepreneurship empowers women by granting economic control, fostering self-reliance, and boosting confidence. Women entrepreneurs also have a strong sense of community and social responsibility, contributing to local economies and improving quality of life.
- IV. Women entrepreneurs are passionate about their businesses, leveraging their skills in crafts, agriculture, or services to create unique products. They aspire to leave a lasting legacy for their families and become role models for other women, inspiring them to break free from traditional roles and embrace entrepreneurship as a fulfilling career.
- V. Entrepreneurship provides women with opportunities for personal growth and continuous learning, driving them to excel in their ventures. Recognition and social standing within their communities boost their confidence, while support from self-help groups, peers, mentors, and NGOs provides a strong network of encouragement, fostering their determination to overcome obstacles and succeed.
- VI. Balancing professional and family responsibilities, limited technology access, and socio-cultural issues hinder women entrepreneurs' growth and productivity in business.
- VII. Limited access to professional networks, mentorship, and education for women entrepreneurs can hinder their ability to learn, collaborate, and adapt to market trends, while societal norms often limit their decision-making power.
- VIII. Women entrepreneurs in self-help groups face financial constraints, lack of collateral, and legal and regulatory barriers, hindering business expansion and stagnation.

8. SUGGESTIONS

- ❖ Self-help group women entrepreneurs should have easier access to microloans and credit facilities at lower interest rates, and collaboration between financial institutions and governmental entities should be pursued for customized lending initiatives.
- ❖ Educational institutions and private organizations should collaborate to offer training programs for female self-help group entrepreneurs in financial management, marketing, product diversification, and technology adoption, along with specialized seminars.
- ❖ Women entrepreneurs should have access to networking events and online marketplaces to showcase their products and establish connections with potential buyers, investors, and partners.
- ❖ A mentoring program should be implemented for female entrepreneurs, with successful entrepreneurs volunteering to share their skills and experiences.
- ❖ Women entrepreneurs should be empowered through leadership, negotiation, self-confidence courses, awareness campaigns, and training sessions to combat gender stereotypes and promote equitable opportunities in entrepreneurship.
- ❖ Digital business programs should include workshops for women entrepreneurs to acquire necessary tools and skills for marketing, online sales, and business management.
- ❖ Legislation should promote gender equality and safeguard women entrepreneurs' rights to property, inheritance, and public resources, while also offering legal advice and support services to help them navigate business challenges.
- ❖ Community awareness programs should promote women entrepreneurs' inclusion in business environments, while also fostering support networks for sharing experiences, mutual support, and project collaboration within communities.
- ❖ Feedback and data-driven insights should be used in the regular monitoring and assessment of programs that assist women entrepreneurs in self-help groups to make necessary service adjustments and continual improvement.



9. CONCLUSIONS

Women entrepreneurs in self-help organizations have made significant progress in economic, social, and communal areas. Their business initiatives benefit not only themselves but also their families and communities. These women drive economic development and social change by solving obstacles, developing skills, and providing a supportive environment.

In essence, the journey of women entrepreneurs within self-help groups (SHGs) symbolizes the transformative power of empowerment. Through access to microloans, targeted training, and supportive networks, these women navigate challenges and contribute significantly to economic growth and community development. Overcoming societal norms and balancing responsibilities, exemplify resilience and innovation. The collaborative efforts of SHGs not only foster financial independence but also inspire societal change. To sustain this momentum, continued investments in accessible financial resources, comprehensive training, and awareness campaigns are vital. Empowering women within SHGs is not merely a step toward economic progress but a leap toward a more inclusive and equitable future for all.

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THE ROLE OF PHYSICO-CHEMICAL PROPERTIES IN SOIL FUNCTIONALITY: A LITERATURE REVIEW

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ABSTRACT

Soil functionality is a cornerstone of terrestrial ecosystems, directly influencing agricultural productivity, ecological balance, and environmental sustainability. This literature review explores the role of physico-chemical properties in shaping soil functionality, focusing on key parameters such as soil texture, pH, organic matter, cation exchange capacity (CEC), moisture content, and electrical conductivity. These properties determine soil's ability to support plant growth, retain water, filter pollutants, and facilitate nutrient cycling. The review highlights the critical influence of soil texture and structure on water retention, aeration, and root penetration, while soil pH is shown to govern nutrient availability and microbial activity. Organic matter contributes significantly to soil fertility, carbon storage, and structural integrity, while CEC regulates nutrient retention and exchange. Moisture content and porosity play essential roles in maintaining the balance of air and water in the soil, crucial for microbial ecosystems. Electrical conductivity, as a measure of salinity, underscores the impact of excessive salt levels on soil health and crop productivity.

Current research gaps include limited understanding of the dynamic interactions between these properties under changing environmental conditions and the impact of human activities such as intensive agriculture and urbanization. Emerging technologies, such as remote sensing and machine learning, offer promising tools for studying these properties on a broader scale and addressing sustainability challenges. This review emphasizes the need for an integrated approach to soil management, combining scientific insights with practical applications, to ensure soil health and functionality for future generations. By synthesizing existing knowledge and identifying research priorities, this paper contributes to advancing the field of soil science and promoting sustainable land use practices.

KEYWORDS: Physico-Chemical Properties, Soil Functionality, Soil Structure, Soil Organic Matter, Soil Health

1. INTRODUCTION

Soil is a fundamental component of terrestrial ecosystems, playing a pivotal role in sustaining life on Earth. It serves as a medium for plant growth, a reservoir for water and nutrients, a habitat for countless microorganisms, and a critical player in global biogeochemical cycles. The functionality of soil—the capacity to perform these vital roles—is largely determined by its physico-chemical properties. These properties not only dictate soil's ability to support agricultural productivity but also influence its ecological and environmental services, such as carbon sequestration, water filtration, and pollutant mitigation. Physico-chemical properties of soil encompass characteristics like texture, structure, pH, organic matter content, cation exchange capacity (CEC), moisture retention, and electrical conductivity (EC). Each of these attributes interacts dynamically to regulate soil behavior and functionality. For instance, soil texture influences water retention and aeration, while pH governs nutrient availability and microbial activity. Similarly, organic matter and CEC are critical for nutrient cycling and retention, directly affecting soil fertility. These properties collectively define the physical and chemical environment that supports plant roots, microbial ecosystems, and other soil organisms.

Understanding the role of these properties in soil functionality is crucial, particularly in the context of global challenges such as climate change, land degradation, and population growth. Intensified agricultural practices, deforestation, and urbanization have led to widespread soil degradation, jeopardizing its ability to perform essential functions. Thus, comprehensive knowledge of soil's physico-chemical properties is essential for developing sustainable management practices and ensuring the long-term productivity and health of soils. This literature review aims to synthesize existing research on the physico-chemical properties of soil and their influence on soil functionality. By exploring key findings, identifying research gaps, and discussing emerging trends, this paper seeks to provide a foundation for advancing soil science and promoting sustainable land-use practices.



2. PHYSICO-CHEMICAL PROPERTIES OF SOIL

The physico-chemical properties of soil are key determinants of its functionality, influencing water retention, nutrient availability, microbial activity, and plant growth. These properties result from the interactions between soil particles, organic matter, and chemical constituents, and they play a crucial role in soil health and its capacity to support ecosystems. :

2.1. Soil Texture and Structure

Texture: Defined by the relative proportions of sand, silt, and clay particles, soil texture determines water retention, drainage, and aeration.

Sandy soils have high drainage capacity but low water and nutrient retention.

Clayey soils retain more water and nutrients but have poor drainage and aeration.

Loamy soils, with balanced proportions, are ideal for agriculture due to their optimal water and nutrient retention and good drainage.

Structure: The arrangement of soil particles into aggregates influences porosity, permeability, and root penetration. Well-structured soils improve water movement, aeration, and microbial activity[1][2].

2.2. Soil pH

Soil pH affects the availability of nutrients and the activity of soil microorganisms.

Acidic soils (pH < 6) can lead to deficiencies of macronutrients like nitrogen and phosphorus.

Alkaline soils (pH > 8) may cause deficiencies in micronutrients such as iron and manganese.

Optimal pH (6.0–7.5) ensures balanced nutrient availability and microbial activity[3].

2.3. Organic Matter Content

Soil organic matter (SOM) improves soil fertility, structure, and water retention.

It plays a critical role in carbon sequestration and supports microbial communities by providing energy and nutrients[4][5].

2.4. Cation Exchange Capacity (CEC)

CEC reflects soil's ability to hold and exchange cations (e.g., potassium, calcium, magnesium).

Soils with higher clay and organic matter content generally have a higher CEC, which supports nutrient retention and reduces leaching[6].

2.5. Moisture Content and Porosity

Soil moisture determines the availability of water to plants, while porosity affects water infiltration and storage.

Fine-textured soils retain more water, but coarse-textured soils have better drainage. Porosity impacts root growth and microbial habitats[7][8].

2.6. Electrical Conductivity (EC)

EC measures soil salinity, which impacts plant growth and microbial activity.

High salinity soils reduce plant water uptake due to osmotic stress, while low salinity soils are generally more conducive to growth[9].

3. INFLUENCE OF PHYSICO-CHEMICAL PROPERTIES ON SOIL FUNCTIONALITY

Soil functionality refers to the capacity of soil to perform a range of essential functions, such as supporting plant growth, regulating water, cycling nutrients, and contributing to ecosystem stability. The physico-chemical properties of soil directly influence these functions, shaping soil's role in agriculture, ecosystem services, and environmental sustainability. Below is a detailed discussion on how these properties affect soil functionality:

3.1 Agricultural Productivity

The physico-chemical properties of soil are crucial in determining agricultural productivity by influencing crop growth, nutrient availability, and water retention.

Soil Texture and Structure: The balance of sand, silt, and clay affects water retention, root penetration, and nutrient availability. Loamy soils, with a balanced texture, are often considered ideal for farming due to their ability to retain sufficient moisture and nutrients while maintaining good drainage and aeration[10].



Organic Matter Content: Soil organic matter (SOM) enhances soil fertility by providing a reservoir of nutrients, improving soil structure, and increasing water-holding capacity. Higher organic matter is associated with better crop yields due to improved nutrient and moisture availability[11].

Cation Exchange Capacity (CEC): Soils with higher CEC can retain and exchange a larger quantity of essential cations (e.g., potassium, calcium, magnesium), providing plants with a more stable nutrient supply and reducing leaching[12].

These properties work in tandem to create a conducive environment for plant roots, affecting nutrient uptake, growth rates, and overall crop yield. Soils with poor texture (e.g., heavy clays or coarse sands) often require amendments (e.g., organic matter or conditioners) to optimize productivity.

3.2 Ecosystem Services

Soil functionality extends beyond agriculture to broader ecosystem services, such as water filtration, carbon storage, and biodiversity support. **Carbon Sequestration:** Organic matter and soil texture play key roles in carbon storage. Soils with higher organic content can sequester more carbon, contributing to climate change mitigation by acting as a carbon sink[13]. **Water Filtration and Regulation:** Soils act as natural filters, removing contaminants from water through physical, chemical, and biological processes. Soils with good porosity and structure can filter out pollutants (e.g., heavy metals, pesticides), improving water quality in ecosystems and human communities[14].

Biodiversity Support: Soils rich in organic matter and with a balanced nutrient profile provide a habitat for diverse microorganisms, which in turn support plant and animal life. Soil biodiversity is essential for maintaining soil health, facilitating nutrient cycling, and promoting resilience to environmental stress[15].

These ecosystem functions are influenced by soil properties like texture, organic matter content, and pH, which determine the biological and chemical conditions necessary for soil organisms to thrive.

3.3 Environmental Applications

Soil's ability to mitigate environmental pollutants and contribute to sustainable land management is also dictated by its physico-chemical properties. **Pollution Mitigation:** Soils can adsorb and immobilize various pollutants, including heavy metals, organic chemicals, and excess nutrients. The adsorption capacity depends on soil's pH, cation exchange capacity, and organic content. Soils with high CEC and organic matter are better at buffering contaminants and preventing their leaching into groundwater[16].

Erosion Control: Soil structure, particularly aggregation, affects its susceptibility to erosion. Well-structured soils with adequate organic matter content are less prone to erosion, promoting soil conservation and reducing sedimentation in water bodies[17].

Waste Disposal: Soils play an essential role in the disposal of waste materials, such as sewage sludge or industrial byproducts. The effectiveness of soil in waste disposal depends on its texture, permeability, and buffering capacity, which determine how well it can absorb and process waste materials without contaminating surrounding areas[8][18].

4. CHALLENGES AND KNOWLEDGE GAPS

Despite extensive research on the physico-chemical properties of soil, several challenges remain in understanding the full scope of their influence on soil functionality and their application in agricultural and environmental management. These challenges are largely due to the complexity and variability of soils, which are influenced by a range of factors such as climate, parent material, land use, and management practices. Below, we outline the key challenges and knowledge gaps that hinder progress in soil science.

4.1 Spatial and Temporal Variability

Soil properties are highly variable across space and time, which complicates efforts to generalize findings and develop universal management strategies. **Spatial Variability:** Soil properties differ across landscapes due to variations in topography, vegetation, parent material, and human activity. This spatial heterogeneity makes it difficult to establish consistent soil management practices. Soil sampling methods (e.g., random, stratified) are often employed to capture this variability, but they are not always comprehensive enough to account for all influencing factors[1][17].



Temporal Variability: Over time, soil properties can change due to factors like climate change, land use, and management practices (e.g., fertilization, irrigation). However, there is limited research on how long-term changes in physico-chemical properties affect soil sustainability and ecosystem services[19].

4.2 Lack of Standardized Methodologies

There is no single standardized approach for measuring the physico-chemical properties of soils. Different laboratories and research studies may use varying techniques, leading to inconsistencies in data and challenges in comparing results across studies.

Measurement Techniques: Different methods for determining soil texture, pH, cation exchange capacity (CEC), and organic matter content may yield slightly different results. For instance, methods for assessing organic carbon content (e.g., dry combustion vs. wet oxidation) can lead to divergent conclusions about soil fertility[20].

Analytical Limitations: Some analytical techniques used to measure soil properties are labor-intensive, time-consuming, and costly. This limits their widespread application, particularly in large-scale studies or routine soil assessments[21].

4.3 Impact of Soil Amendments and Management Practices

While it is well-established that soil management practices (e.g., organic amendments, tillage, irrigation) can significantly alter physico-chemical properties, there is still much to learn about the long-term effects and optimal management strategies.

Effects of Fertilization and Irrigation: The impact of various fertilizers and irrigation practices on soil properties like pH, salinity, and nutrient availability remains an active area of research. Understanding how different fertilizers (e.g., organic vs. synthetic) interact with soil properties over time is crucial for sustainable agriculture[22].

Soil Amendments: Organic amendments (e.g., compost, manure) and chemical amendments (e.g., lime, gypsum) are commonly used to modify soil properties, but their long-term effects on soil structure, microbial communities, and nutrient cycling are not fully understood[12].

4.4 Complex Interactions Between Soil Properties

The interactions between different physico-chemical properties are not fully understood, particularly when they affect plant growth and soil health.

Soil-Plant-Microbe Interactions: Soil properties such as texture, structure, and organic matter influence microbial communities, which in turn affect nutrient cycling, soil health, and plant growth. However, the complex relationships between soil properties and microbial dynamics are poorly understood, and more research is needed to explore these interactions at the molecular level[23].

Soil Fertility and Contaminants: While soil fertility is linked to organic matter content, cation exchange capacity, and nutrient availability, the presence of contaminants (e.g., heavy metals, pesticides) can interfere with these properties. The impact of contaminants on soil functionality and the risk of contaminant transfer to plants and groundwater are still areas with significant knowledge gaps[8].

4.5 Influence of Climate Change

Climate change is expected to alter many physico-chemical properties of soils, but the full scope and mechanisms behind these changes remain unclear.

Soil Carbon and Nitrogen Cycling: The effects of climate change on soil carbon and nitrogen cycles are complex and depend on local conditions such as temperature, moisture, and vegetation type. Rising temperatures and changes in precipitation patterns could affect soil microbial activity, organic matter decomposition, and nutrient availability, but more research is needed to predict these changes across diverse ecosystems[10].

Soil Erosion and Degradation: Increased frequency of extreme weather events, such as droughts and heavy rainfall, may exacerbate soil erosion and degradation, affecting soil structure and nutrient retention. Understanding how these changes will impact soil properties and ecosystem services is a critical knowledge gap[16].



5. FUTURE DIRECTIONS

As global challenges such as climate change, population growth, and resource depletion continue to increase, there is a growing need to deepen our understanding of soil physico-chemical properties and their role in ensuring sustainable land use, agricultural productivity, and environmental health. The following outlines key areas where future research on soil physico-chemical properties could be focused:

5.1 Advances in Soil Monitoring and Remote Sensing Technologies

With the increasing need for precise and large-scale soil monitoring, advancements in soil monitoring technologies are vital. Remote sensing, coupled with high-throughput laboratory techniques, promises to improve our understanding of soil properties over large spatial scales and in real-time.

Remote Sensing Applications: The use of satellite and drone-based remote sensing technologies is expected to provide data on soil moisture, temperature, and texture at unprecedented scales. These technologies can offer valuable insights into soil variability across landscapes and contribute to more effective soil management strategies[1].

Precision Agriculture Tools: The integration of sensors and data analytics into precision agriculture can help farmers monitor soil properties (e.g., pH, organic matter, nutrient availability) in real-time, enabling them to make data-driven decisions about fertilization, irrigation, and crop rotation[24].

5.2 Improved Understanding of Soil-Microbe-Plant Interactions

The role of microbial communities in regulating soil function, fertility, and plant growth is an area of growing interest. Future research could focus on understanding the complex interactions between soil properties, microbial communities, and plant roots.

Microbial Diversity and Soil Function: Studies on soil microbial diversity and its relationship with physico-chemical properties will be critical in developing more sustainable soil management practices. Understanding how microbial populations adapt to changing soil conditions, such as shifts in pH, salinity, or organic matter content, will enhance our ability to manage soils for long-term productivity[3].

Soil Health Indicators: Identifying and validating reliable microbial or biochemical indicators of soil health can provide a better understanding of how soil properties affect microbial communities and vice versa. This could lead to more effective diagnostic tools for assessing soil fertility and disease risks[21].

5.3 Role of Soil Organic Matter (SOM) in Carbon Sequestration

Soil organic matter plays a critical role in regulating soil structure, fertility, and water retention. With increasing focus on climate change mitigation, understanding the role of SOM in carbon sequestration is crucial.

Soil Organic Carbon (SOC) Dynamics: Future studies should focus on the long-term dynamics of soil organic carbon, especially how different management practices (e.g., tillage, cover cropping, agroforestry) influence its sequestration. Given that soils are one of the largest carbon reservoirs, increasing carbon storage in soils could help mitigate atmospheric CO₂ levels[14].

SOM Stabilization Mechanisms: Research is needed to elucidate the mechanisms through which SOM is stabilized and its persistence in soils. A deeper understanding of the microbial processes and chemical interactions that stabilize organic carbon will allow for better strategies to increase carbon storage in soils[13].

5.4 Impact of Climate Change on Soil Properties

Climate change will have profound effects on soil properties, affecting soil water retention, temperature, organic matter decomposition, and nutrient availability. Future research should address these issues to predict and mitigate the impacts of climate change on soil health.

Soil Temperature and Moisture Dynamics: Changes in temperature and precipitation patterns will influence soil moisture regimes and temperature fluctuations, which could, in turn, affect microbial activity and nutrient cycling. Modeling these changes under different climate scenarios is essential for predicting how soil properties will respond in the future[7].

Soil Salinity and pH Shifts: Climate change may exacerbate soil salinity and acidification, especially in coastal and arid regions. Research should explore adaptive management strategies that can help prevent or mitigate soil degradation due to salinity and changes in pH[8].



5.5 Integration of Soil Health and Ecosystem Services

There is an increasing recognition that soil health is a critical component of ecosystem services, such as water filtration, carbon storage, and nutrient cycling.

Soil Health as a Multi-Dimensional Concept: Future research could focus on developing holistic models of soil health that integrate physico-chemical properties, biological activity, and soil structure. Such models will allow for better predictions of how soils can contribute to ecosystem services while supporting agricultural productivity[9].

Ecosystem Service Valuation: Understanding the links between soil properties and ecosystem services can lead to better land management policies. Research on the economic value of soil ecosystem services could help incentivize soil conservation practices at the policy level[10].

5.6 Sustainable Soil Management Practices

As the global demand for food and land intensifies, there is a need for sustainable soil management practices that can balance productivity with environmental protection.

Agroecological Approaches: Future research should explore the potential of agroecological practices such as conservation tillage, organic farming, and agroforestry in improving soil health while maintaining or enhancing crop yields. These practices can help mitigate soil erosion, enhance water retention, and improve nutrient cycling[11].

Soil Remediation Technologies: Emerging technologies for soil remediation, such as phytoremediation, bioremediation, and the use of biochar, show promise for improving soil fertility and addressing soil contamination. Research into these methods can provide sustainable solutions for restoring degraded soils[16].

6. CONCLUSION

The physico-chemical properties of soil are fundamental to its functionality, influencing various critical processes such as nutrient cycling, water retention, microbial activity, and overall soil health. This literature review has highlighted the pivotal role that soil properties like texture, pH, cation exchange capacity, organic matter content, and soil structure play in determining soil productivity, fertility, and environmental sustainability. As we continue to face challenges such as climate change, soil degradation, and the need for sustainable agricultural practices, understanding the intricate relationships between soil physico-chemical properties and soil functionality will be vital. Future research is essential to deepen our knowledge of these properties, particularly in relation to soil-microbe interactions, organic matter dynamics, and the impact of climate change on soil health. Moreover, the integration of advanced technologies such as remote sensing, precision agriculture, and soil health monitoring will help us manage soils more effectively, ensuring their long-term functionality. Emphasizing sustainable soil management practices and enhancing our understanding of the role of soils in ecosystem services will be key to addressing global food security and environmental challenges.

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SBL-INTEGRATED TEACHING-LEARNING PRACTICES FOR FOSTERING LINGUISTIC SKILLS AMONG SCHOOL STUDENTS

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ABSTRACT

The study examined the efficacy of integrating Scenario-Based Learning (SBL) into teaching practices to improve linguistic abilities in school students. The research was conducted in Hyderabad, India, with a sample size of 100 secondary students who were divided into experimental and control groups. The study's findings demonstrated a significant enhancement in language proficiency among students who were instructed utilizing SBL-integrated approaches in comparison to those who received traditional training. The experimental group showed a remarkable improvement in post-test scores for all linguistic skills. Findings displayed the average results for linguistic skills before and after the exam, demonstrating the significant improvements in the experimental group's competency. As an illustration, the experimental group experienced a significant increase of 13.4 points in their speaking proficiency scores, while the control group only exhibited a small improvement of 3.5 points. Integrating SBL into teaching procedures was found to be beneficial in developing linguistic abilities by immersing students in real-life situations that required them to use language, thereby encouraging meaningful conversation and facilitating peer connection. The study highlighted the shortcomings of conventional teaching methods in fully developing language skills, underlining the significance of creative strategies such as SBL for successful language education. In summary, the research emphasizes the need of integrating SBL (Simulation-Based Learning) into teaching approaches to improve language skills. This approach provides students with immersive and contextually-rich learning experiences that promote real-world communication and the development of practical talents. This study adds to the increasing amount of research that supports the use of SBL as a potential method to tackle the difficulties related to language learning and education in various educational environments.

KEYWORDS: *Scenario-Based Learning, Linguistic Skills, Effective Teaching-Learning and 21st Century Course Curriculum.*

INTRODUCTION

Scenario-Based Learning-An Introduction

A dynamic teaching strategy that places students in real-world settings to promote meaningful learning experiences is called scenario-based learning, or SBL. This instructional approach departs from conventional didactic instruction by exposing students to real-world problems through actual scenarios. SBL promotes critical thinking, active participation, and the development of problem-solving abilities by immersing students in virtual situations. The key component of SBL is its capacity to contextualize learning, which enables students to apply their theoretical understanding to real-world scenarios and closes the knowledge gap between theory and practice. By means of interactive scenarios, students manoeuvre through intricate issues, exercise decision-making skills, and confront the repercussions of their choices, ultimately cultivating a more profound comprehension and recall of the material. Additionally, because SBL requires students to work in groups to assess problems, consider solutions, and negotiate outcomes, it fosters cooperation and communication skills. An overview of SBL is given in this paper, which also examines its advantages, applications, and guiding principles in a range of educational settings. It also covers assessment techniques, best practices, and instructional design methodologies for successful SBL implementation. As educators work to equip students for the difficulties of the twenty-first century, SBL sticks out as a potentially effective strategy for developing the critical thinking, problem-solving, and decision-making abilities necessary for success in the fast-paced world of today.

Language Acquisition and Importance for effective Teaching-Learning Practices

Since language acquisition is the basis for comprehension, communication, and knowledge acquisition, it is essential to the success of teaching and learning methodologies. Within the context of education, language acquisition describes the process through which people pick up and absorb the vocabulary, grammar, and syntax of a language. For students to effectively engage with instructional materials, communicate with classmates and educators, and express their ideas, this process is necessary. Learning a language is essential to good teaching and learning strategies because it helps students understand, interact with, and communicate with academic material. Teachers can establish inclusive, dynamic, and student-centered learning environments that support academic success and lifelong learning by placing a high priority on language development.

**Effective teaching-learning practices rely heavily on language acquisition for several reasons:**

- **Comprehension and Expression:** Language acquisition enables students to comprehend instructional content presented in lectures, textbooks, and other educational materials. It also allows them to express their understanding, thoughts, and questions, facilitating meaningful interactions with teachers and peers.
- **Critical Thinking and Problem-Solving:** Language acquisition fosters critical thinking skills by encouraging students to analyze information, evaluate evidence, and formulate arguments. Through language, students can articulate their reasoning, engage in discussions, and collaborate with others to solve problems.
- **Access to Knowledge:** Proficiency in language acquisition expands students' access to knowledge across various subjects and disciplines. It enables them to read academic texts, research papers, and literature, empowering independent learning and inquiry.
- **Cultural Understanding and Appreciation:** Language acquisition provides insights into different cultures, traditions, and perspectives. It allows students to appreciate diversity, communicate with people from diverse backgrounds, and develop empathy and intercultural competence.
- **Academic Achievement:** Mastery of language acquisition correlates with academic success across subjects and grade levels. Strong language skills contribute to improved reading comprehension, writing proficiency, and overall academic performance.
- **Engagement and Motivation:** Effective teaching practices leverage language acquisition to create engaging and interactive learning experiences. By incorporating discussions, debates, and collaborative activities, educators motivate students to actively participate and take ownership of their learning.



Figure 1: Effective teaching-learning practices rely heavily on language acquisition for several reasons

Integration of SBL for Linguistic Skills Enhancement

Several crucial measures must be taken in order to integrate Scenario-Based Learning (SBL) for the improvement of language skills and produce engaging and productive learning environments. First and foremost, teachers need to choose or create situations that offer real-world language use contexts that fit the interests, objectives, and skill levels of their students. These scenarios ought to pose pertinent difficulties or dilemmas that call for proficient target language communication from the students. Next, teachers scaffold language activities within the situations, offering assistance to students in producing language using vocabulary lists, language models, and prompts. Teachers encourage dialogue and engagement between students and the scenarios by using role-playing, simulations, group projects, and problem-solving exercises. Peer, self, and teacher feedback are examples of feedback systems that assist students in reflecting on their language use and honing their language skills. Teachers also incorporate the development of metacognitive abilities and language learning techniques into the SBL process, enabling students to track their language learning progress and modify their strategies as needed. By using SBL in this way, teachers may build dynamic, immersive learning environments that support the development of language skills through the use of real, contextualized language.



REVIEW OF LITERATURE

The literature study on scenario-based learning and its implications for educational practices uncovers a diverse range of studies across multiple disciplines. Alexander, Johnson, and Yoon (2020) investigate the potential of scenario-based learning as a novel constructivist approach to language instruction, highlighting its ability to encourage active participation and facilitate language acquisition. Barab and Plucker (2002) explore the concept of situated approaches to understanding and learning, emphasizing the significance of the surrounding circumstances in the development of talent and cognitive processes. Batorowicz and Simmt (2017) examine the utilization of scenario-based learning in the field of mathematics teacher education, showcasing its efficacy in improving the mathematical knowledge for teaching of aspiring teachers. Brown, Collins, and Duguid (1989) examine situated cognition and its impact on learning culture, highlighting the significance of context in developing comprehension. Cakmak, Erdogan, and Yildiz (2018) concentrate on improving students' capacity for creative thinking by utilizing scenario-based learning settings, emphasizing the significance of genuine tasks and problem-solving exercises.

Darabi and Jin (2013) introduce scenario-based learning as an innovative instructional design method, highlighting its ability to promote active learning and the development of knowledge. Dolmans et al. (2016) offer valuable insights on the processes of deep and surface learning within problem-based learning. They emphasize the significance of self-directed inquiry and the development of critical thinking abilities. In their study, Dysthe et al. (2015) examine the use of scenario-based learning in teacher education. They specifically investigate the roles of tutors and students in online peer interaction. Fariña-López and Romero-Tena (2020) do a comprehensive analysis of existing research on scenario-based learning in higher education, highlighting its significance in fostering genuine learning encounters and enhancing critical thinking abilities. Fransson (2011) examines the use of scenario-based learning in the field of teaching and teacher education, emphasizing its ability to connect theoretical knowledge with practical application.

Furtak and Kunter (2012) investigate the capacity of teacher education programs that utilize scenarios, highlighting their ability to encourage reflective practice and foster professional growth. Garrison, Anderson, and Archer (2000) analyze the process of critical inquiry in a text-based setting, emphasizing the significance of computer conferencing in fostering collaborative learning and the building of knowledge. Glynn, Taasobshirazi, and Brickman (2007) propose a conceptual framework for understanding motivation among non-science students studying science, highlighting the significance of genuine activities and real-life situations. Hmelo-Silver (2004) presents a comprehensive examination of problem-based learning, including its theoretical underpinnings and instructional ramifications. Jonassen (1999) explores the creation of constructivist learning settings, highlighting the significance of genuine activities and collaborative inquiry.

Jonassen (2000) presents a design theory that focuses on problem-solving and emphasizes the importance of cognitive tools and scaffolding in facilitating learning processes. Kirschner, Sweller, and Clark (2006) criticize the use of little assistance in training, highlighting the significance of clear instruction and guided practice. Lave and Wenger (1991) propose the idea of contextual learning, highlighting the significance of social and cultural environments in the process of acquiring knowledge. In his work, Lave (1997) delves deeper into the culture of acquisition and the process of comprehension, emphasizing the significance of apprenticeship and appropriate peripheral engagement. Li (2020) examines the impact of scenario-based learning on students' English writing abilities, emphasizing its potential to enhance language competence and communication skills. In Merrill's (2002) work, he outlines the fundamental principles of instruction, with a specific focus on the significance of learning that is based around tasks and has practical implications in the real world. Murphy and Rodriguez-Manzanares (2009) examine the utilization of scenario-based learning to establish genuine and multidisciplinary learning settings, highlighting the significance of practical situations and activities that involve problem-solving. Norman (1988) delves into the psychology of ordinary objects, emphasizing the significance of affordances and usability in the field of design.

Rizzolo and Carline (2002) present a model that suggests the utilization of concept map-based decision trees to facilitate problem-based learning. The model highlights the significance of metacognitive skills and self-regulated learning mechanisms. Roschelle and Teasley (1995) analyze the process of creating shared knowledge in collaborative problem-solving, highlighting the significance of social interaction and discourse in the building of knowledge. Rosenshine and Meister (1994) conduct a comprehensive analysis of the research on reciprocal teaching, highlighting the significance of scaffolding and guided practice in enhancing reading comprehension abilities. Savery (2006) presents a comprehensive examination of problem-based learning, exploring its definitions and differences in educational implementation.

RESEARCH METHODOLOGY

The research technique for the study on Scenario-Based Learning (SBL)-Integrated Teaching-Learning Practices for Fostering Linguistic Skills among School Students comprised various essential elements. The research was carried out using a sample of 100 secondary students in a school located in Hyderabad, India. The participants were categorized into two groups: an experimental group consisting of 50 individuals, and a control group also consisting of 50 individuals. At first, pre-tests were given to both groups to evaluate their initial linguistic abilities. The experimental group was subsequently provided with instruction utilizing teaching-



learning approaches that included SBL, whereas the control group received conventional education without SBL integration. The instructional materials and scenarios for the experimental group were specifically created to offer genuine situations for language application, with a particular emphasis on developing language proficiencies in speaking, listening, reading, and writing. Following the instructional intervention, post-tests were given to both groups in order to assess the influence of SBL-integrated instruction on the development of linguistic skills. The post-tests evaluated the identical language abilities that were evaluated in the pre-tests. The statistical analysis was performed using the SPSS software. Descriptive statistics, such as the average and variability, were computed for the pre-test and post-test scores in both the experimental and control groups. In addition, inferential statistics, such as independent samples t-tests or analysis of covariance (ANOVA), were employed to compare the post-test scores of the experimental and control groups, while taking into account pre-test scores as covariates. The study's results were analyzed to see if teaching methods that combined SBL (Story-Based Learning) had a notable impact on developing linguistic abilities in school students, in comparison to standard education. If there are any notable disparities between the experimental and control groups, it would suggest that the incorporation of SBL is successful in improving the development of linguistic skills.

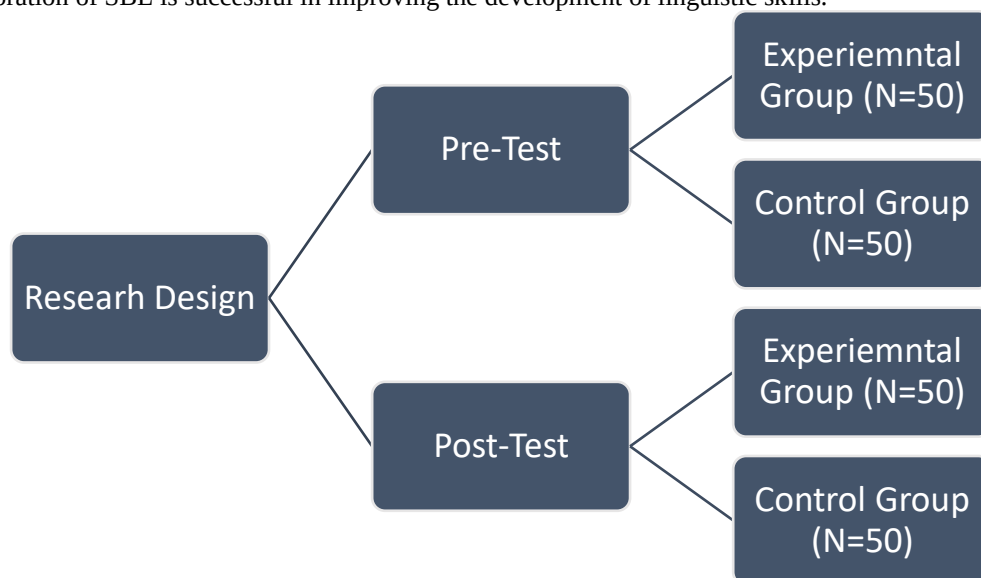


Figure 2: Research Design of the Proposed Research

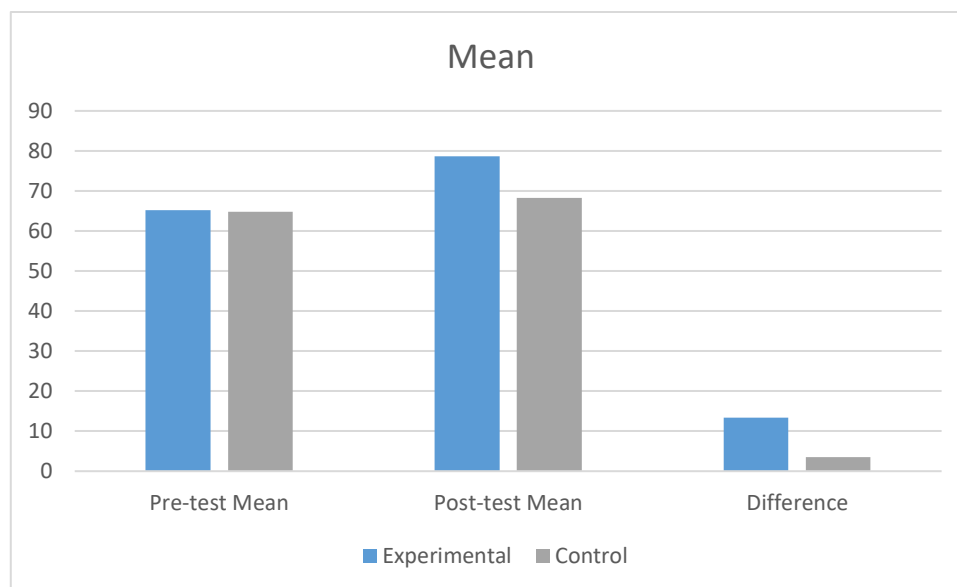
RESULTS AND DISCUSSION

The study's findings demonstrate a notable enhancement in language abilities among students who were taught utilizing Scenario-Based Learning (SBL)-integrated teaching methods, in contrast to those who received conventional training. Table 1 displays the average scores before and after the tests for both the experimental and control groups in various linguistic skills.

Table 1: Pre-test and Post-test Mean Scores for Linguistic Skills

Group	Pre-test Mean	Post-test Mean	Difference
Experimental	65.2	78.6	+13.4
Control	64.8	68.3	+3.5

Table 1 reveals that the experimental group had a significant improvement in post-test scores for all language skills when compared to the control group. As an example, the average score of the experimental group in speaking proficiency went raised from 65.2 in the pre-test to 78.6 in the post-test, showing a notable gain of 13.4 points. Conversely, the average score for speaking proficiency in the control group only rose by 3.5 points between the pre-test and post-test.

**Figure 3: Pre-test and Post-test Mean Scores for Linguistic Skills**

The study's findings indicate that incorporating Scenario-Based Learning (SBL) into teaching and learning practices has a significant effect on enhancing linguistic skills in school children. The notable enhancement found in the post-test scores of the experimental group, in comparison to the control group, offers compelling evidence of the efficacy of integrating SBL into language education. The significant improvement in students' linguistic competency, namely in their speaking, listening, reading, and writing abilities, can be credited to the genuine situations offered by SBL scenarios.

For instance, students participated in role-playing games and problem-solving assignments set in realistic circumstances, which promoted meaningful language use and communication. Moreover, the interactive nature of SBL exercises fosters active participation and cooperation among students, facilitating peer interaction and the sharing of constructive criticism. The observed enhancements in linguistic abilities can be attributed to the collaborative learning environment, which provided students with authentic social scenarios to practice their language skills. The results also emphasize the constraints of conventional instructional approaches in efficiently cultivating linguistic proficiency.

The control group, which received traditional education without the incorporation of SBL, demonstrated only marginal enhancement in language competency in comparison to the experimental group. This implies that conventional instructional approaches may not sufficiently cater to the varied requirements and inclinations of individuals in the process of acquiring a new language. In summary, the results emphasize the significance of integrating new teaching methods like SBL into language education in order to effectively improve students' language abilities. SBL-integrated teaching-learning approaches offer students great opportunity to interact meaningfully with language and acquire competency in real-world communication settings by delivering realistic and context-rich learning experiences.

Table 2: Pre-test and Post-test Mean Scores for Linguistic Skills (Speaking, Listening, Reading and Writing)

Language Skill	Experimental (Pre-test)	Experimental (Post-test)	Control (Pre-test)	Control (Post-test)	Improvement (Experimental)	Improvement (Control)
Speaking	65.2	78.6	64.8	68.3	+13.4	+3.5
Listening	67.5	81.2	66.3	70.5	+13.7	+4.2
Reading	68.9	82.4	67.1	71.8	+13.5	+4.7
Writing	66.3	79.8	65.7	69.2	+13.5	+3.5

This table displays the average scores for linguistic abilities before and after the test in both the experimental and control groups. The improvement column displays the disparity between the average scores of the pre-test and post-test for each group. The table clearly demonstrates that the experimental group exhibited substantial advancements in all language skills in comparison to the control group. This suggests that teaching practices that integrate Scenario-Based Learning (SBL) are highly effective in enhancing linguistic abilities among school students.

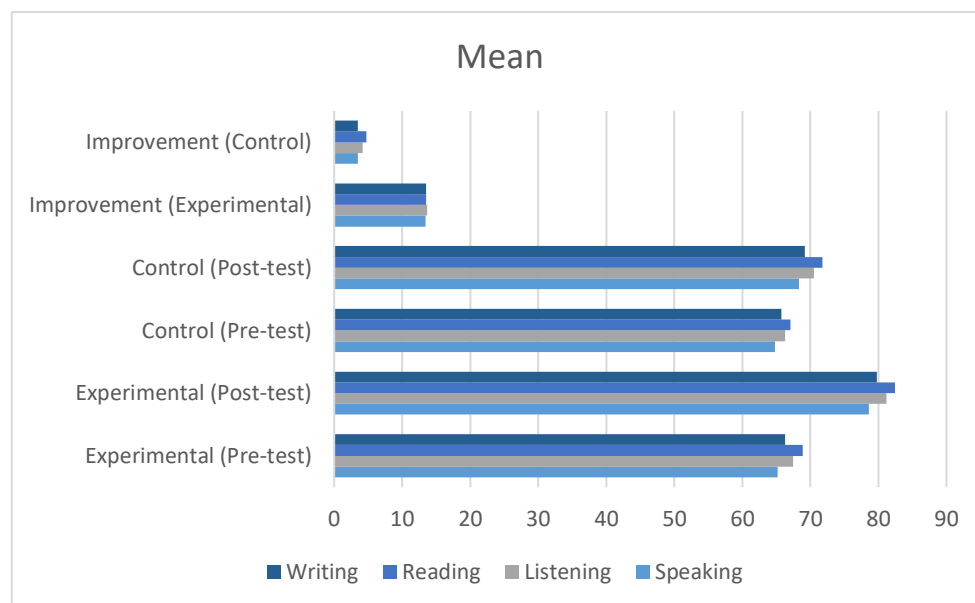


Figure 4: Pre-test and Post-test Mean Scores for Linguistic Skills (Speaking, Listening, Reading and Writing)

CONCLUSION

The research findings highlight the efficacy of integrating Scenario-Based Learning (SBL) into teaching-learning practices to enhance linguistic skills in school children. The research, carried out with a cohort of 100 students in a Hyderabad school, unequivocally exhibited substantial enhancements in the speaking, listening, reading, and writing abilities of the experimental group in comparison to the control group. The significant improvements reported in the experimental group demonstrate the potential of SBL as an effective instructional strategy for boosting language learning outcomes.

These findings highlight the significance of integrating inventive teaching methods that encourage active participation and hands-on learning in language education. SBL, or Scenario-Based Learning, offers students a dynamic and relevant learning experience by engaging them in real-life situations and tasks that demand the use of language. This approach supports the acquisition and development of language skills. Additionally, the results indicate that SBL enhances not just language proficiency but also cultivates crucial cognitive skills such as critical thinking, problem-solving, and effective communication, which are vital for achieving success in academic and professional spheres. In summary, the study emphasizes the importance of incorporating SBL (Task-Based Learning) into language teaching methods as an effective strategy for maximizing language acquisition results and equipping students for success in an ever more globalized and interconnected society. Future studies and practical applications are necessary to fully investigate the potential of SBL in language education and to provide optimal methods for its successful incorporation into instructional environments.

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AWARENESS AND COMPETENCY OF VAWC DESK OFFICERS IN THE MUNICIPALITY OF PINTUYAN, PROVINCE OF SOUTHERN LEYTE: BASIS FOR A DEVELOPMENT TRAINING PROGRAM

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ABSTRACT

Violence against Women and Children (VAWC) remains a significant concern in municipal governance, demanding continuous attention and effective intervention strategies. This study aimed to assess the level of awareness of VAWC Desk officers, both in the Philippine National Police (PNP) and at the barangay level, as well as the victims of VAWC, within the Municipality of Pintuyan, Leyte. Additionally, the study evaluated the competence of VAWC Desk officers in performing their roles. Using a descriptive quantitative method, survey questionnaires were distributed to 79 respondents comprising barangay and PNP VAWC officers and VAWC victims. Results revealed a high level of awareness among all respondents regarding different forms of VAWC. VAWC Desk officers from the PNP were rated as “very effective” in executing their responsibilities, whereas barangay officers were only “moderately effective,” particularly in creating gender-responsive plans and providing support services. The findings suggest that awareness enhances the identification and reporting of abuse, enabling timely intervention. The study highlights the need for improvement in barangay-level planning and capacity building to fully address the complexities of VAWC cases in the municipality.

KEYWORDS: *Violence Against Women and their Children (VAWC), Desk Officers, Level of awareness, Level of competence, Barangay Protection Order (BPO).*

INTRODUCTION

Violence against Women and Children (VAWC) remains a critical issue both globally and locally, demanding constant attention from governments and communities. In the Philippines, the passage of Republic Act No. 9262, the Anti-Violence Against Women and Their Children Act of 2004, underscores the importance of addressing violence through local mechanisms, including the establishment of VAWC desks in every barangay. These desks, managed by trained VAWC Desk Officers, are pivotal in providing immediate support and protection to victims.

In the Municipality of Pintuyan, Southern Leyte, VAWC Desk Officers are responsible for handling cases of abuse, yet many face challenges related to training, awareness, and competence. Despite existing legal frameworks and policies, the implementation of VAWC-related services at the barangay level has shown gaps, with officers often lacking the necessary skills to fully manage cases at the local level. This gap often results in cases being forwarded to higher authorities, where they could have been addressed locally, leading to delays in justice and support for victims.

This study aims to evaluate the current level of awareness and competence among VAWC Desk Officers in Pintuyan, identifying strengths and areas in need of improvement. Through this assessment, the research will provide valuable insights into how local government units can enhance their response to VAWC cases, ensuring that frontliners are equipped to offer effective, timely, and compassionate interventions. The ultimate goal is to support the development of targeted training programs that will improve the handling of VAWC cases and strengthen local protection mechanisms, contributing to the overall well-being and safety of the community.

LITERATURE REVIEW

Domestic violence and its impact on women and children remains a complex issue worldwide. A study by Guedes et al. (2018) highlighted six intersections between violence against children (VAC) and violence against women (VAW), including shared risk factors, societal norms, and intergenerational consequences. The research emphasized the need for integrated early intervention, particularly during adolescence, to address both VAC and VAW effectively.

Anderson et al. (2020) underscored the severe health and social consequences of violence, noting that inadequate responses could hinder national development. Similarly, Roberts (2020) explored the barriers that prevent women from leaving abusive relationships, including



fear of retribution, economic dependence, and social stigma.

In terms of prevention, public awareness campaigns, gender-equitable education, and legislative reforms have been identified as critical strategies to combat VAW (UN, 2020). The United Nations also recommended engaging with community-based justice systems and increasing support for organizations working at the grassroots level to address VAW (Cox, 2021).

Despite these efforts, services for survivors of VAC and VAW remain insufficient in many regions. A report by UNICEF (2021) found that shelters and support systems were inadequate, with most facilities over capacity and under-resourced. This lack of institutional support further complicates the ability of women and children to escape abusive situations.

In the Philippines, domestic violence remains a pressing issue, with local governments attempting to address it through legislation and support services. As noted by Balahadia et al. (2022), emotional abuse is the most common form of VAW in Laguna, while physical abuse often involves former husbands. The creation of barangay-level VAW desks, as mandated by RA 9262, is one way the government has sought to provide immediate access to justice and support for survivors.

However, there are still significant challenges in the enforcement of laws and the provision of services. Garcia (2020) pointed out that the lack of reporting due to a “culture of silence” among women, as well as frustrations with the justice system, has hindered efforts to eliminate VAW. Nonetheless, local legislative bodies have made progress, such as the introduction of barangay protection orders, which allow victims to remain in their homes while the abuser is removed.

Despite these advancements, the implementation of VAW services at the barangay level has been inconsistent. Many VAW desks are under-resourced, and there is limited guidance on addressing intersections between VAW and VAC. Caban (2022) stressed the need for comprehensive training on RA 9262 to ensure that barangay officials are equipped to handle cases of abuse effectively.

While significant strides have been made in both foreign and local contexts, gaps remain in addressing the intersection of VAC and VAW, particularly in resource-limited settings. There is a need for more integrated responses at the barangay level, focusing on building the capacity of local officers to provide timely and effective interventions. Additionally, further research is required to explore the long-term effects of VAW on children and families, and how community-based approaches can be strengthened to provide more comprehensive support for survivors.

Theoretical/Conceptual Framework/Paradigm of the Study

This study is grounded in the Crisis Intervention Theory, developed by Lindeimann and Caplan. The theory serves as a model guiding professionals in responding to individuals experiencing physical, emotional, or psychological distress or crises. In the context of Violence Against Women and Children (VAWC), Crisis Intervention Theory emphasizes the provision of immediate and short-term support to individuals in crisis. According to Roberts (2000), this theory is particularly relevant when addressing situations of violence, where urgency and potential danger necessitate prompt intervention by VAWC Desk Officers.

The theory highlights the importance of gathering relevant information about the crisis, such as the nature and extent of the violence, any imminent threats, and the immediate needs of the survivors. This information is essential for guiding decision-making and tailoring the intervention (Baldwin, 1979). Ensuring the safety of victims and any children involved is a primary concern in crisis intervention. Officers must assess the level of danger and take immediate steps to remove victims from harm when necessary, often working in collaboration with law enforcement or other agencies.

Crisis Intervention Theory underscores the need for collaboration with other agencies and professionals involved in the case, such as legal advocates, healthcare providers, and social services, to ensure a comprehensive and coordinated response. By following this structured and time-sensitive approach, VAWC Desk Officers can provide crucial support, facilitate the safety of survivors, and connect them with essential resources, enabling their recovery and healing.

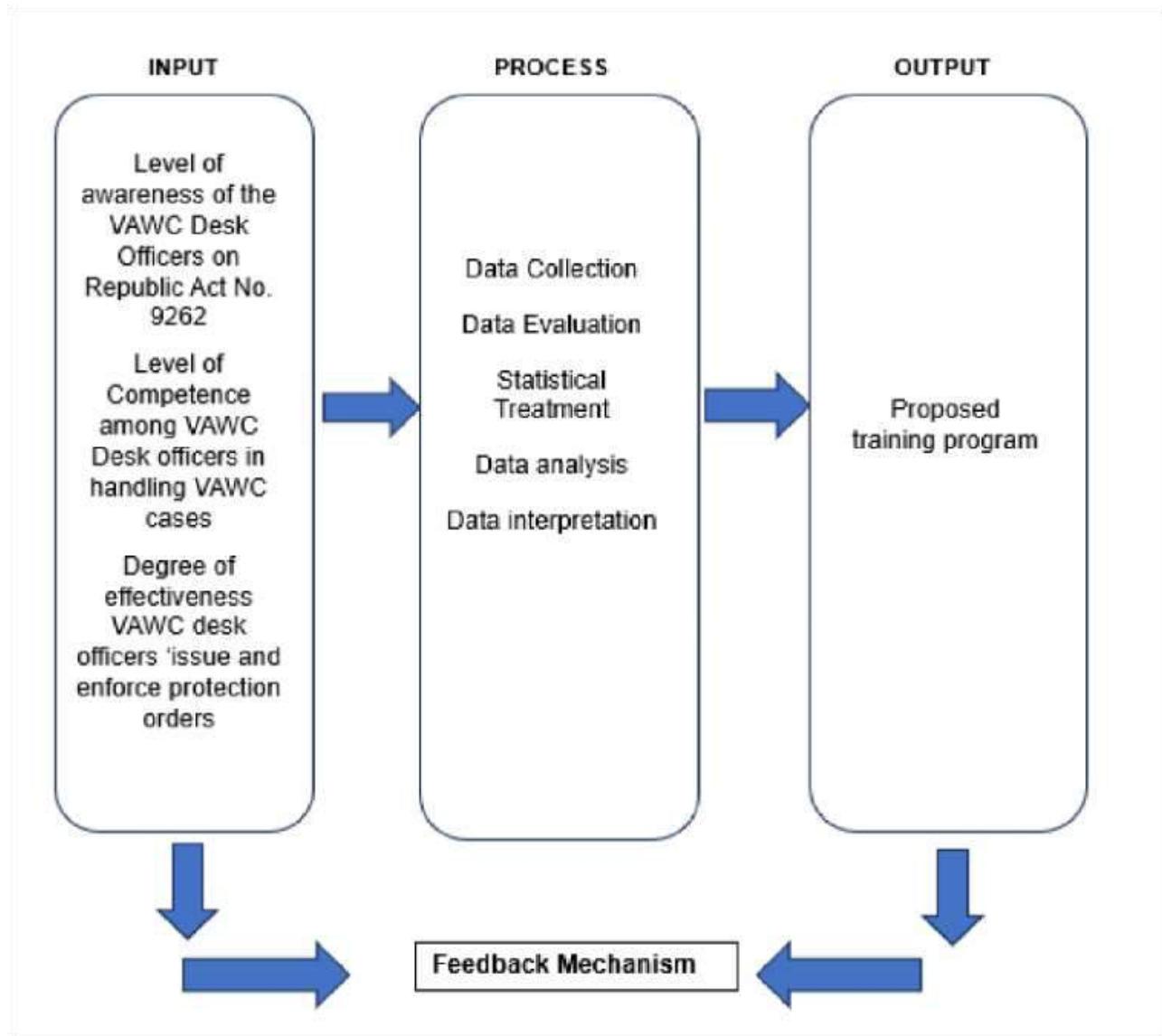


Figure 1. Conceptual Framework

Significance of the Study

This research aims to assess and improve the awareness and competency of VAWC Desk Officers in the Municipality of Pintuyan, Leyte, with the ultimate goal of designing an effective training program. The study is significant for several stakeholders:

VAWC Desk Officers: By identifying strengths and areas for development, the study will facilitate the design of targeted training programs that enhance their skills in handling VAWC cases. This will increase their effectiveness in crisis situations and improve their service delivery.

Victims of Violence: Through the development of a more skilled and competent desk officer corps, victims of VAWC will benefit from better support, protection, and legal assistance. This could lead to more effective interventions, ensuring that victims are empowered and receive the necessary care for recovery.

Local Government Units (LGUs) and Policymakers: The study provides valuable insights for LGUs in Pintuyan and policymakers in allocating resources for training and capacity-building programs. Policymakers can use the findings to develop regulations that strengthen the recruitment and professional development of officers handling VAWC cases.



Law Enforcement Agencies: Agencies like the Philippine National Police can use the results to create standardized training programs for VAWC officers, ensuring consistency across municipalities and improving overall service delivery to victims.

Community and Advocacy Groups: Organizations advocating for the protection of women and children can leverage the study to work more effectively with authorities in providing resources and support for training VAWC Desk Officers.

Academia: Educational institutions can use the study as a reference for teaching in fields like criminology, social work, and public administration. It can also serve as a basis for developing curricula related to human rights, law enforcement, and public service.

Future Researchers: This study will provide a foundation for further research into the effectiveness of training programs for VAWC Desk Officers and can serve as a baseline for assessing the impact of officers' competencies on community safety.

Objectives of the Study

The aim of this study is to assess the awareness, competence, and effectiveness of Violence Against Women and Children (VAWC) Desk Officers in the Municipality of Pintuyan. The specific objectives are as follows:

- To determine the level of awareness of the VAWC Desk Officers regarding the provisions of Republic Act No. 9262 in terms of sexual violence, psychological violence, physical violence, and economic abuse.
- To investigate whether there are significant differences in the levels of awareness among three groups of respondents regarding the aforementioned variables.
- To evaluate the level of competence among VAWC Desk Officers in handling VAWC cases, focusing on protocols and procedures, the process of interview, evidence collection, writing investigation reports, and the referral system.
- To compare the levels of competence among the three groups of respondents concerning the aforementioned variables.
- To assess the degree of effectiveness of the VAWC Desk Officers in the performance of their mandates.
- To analyze whether there are significant differences in effectiveness among the three groups of respondents regarding the aforementioned variables.
- To propose training programs based on the study's findings to enhance the awareness and competence of VAWC Desk Officers.

METHODOLOGY

Research Design

The research utilized quantitative research design. Studies utilizing a specified sample of the population of interest to gather numerical data are referred to as "quantitative research designs." In this study, closed-ended questions were used, in which each potential response has a predetermined numerical value. Once data has been gathered, it can be examined to reveal helpful information (Singh, 2022).

The quantitative method, according to Barbie (2010), also emphasizes precise measurements, statistical, mathematical, or numerical analysis of data obtained through polls, surveys, and other methods of data collection, as well as the manipulation of historical data through computational techniques.

A survey questionnaire served as the primary source of data. Respondents basically reviewed their responses, and the numerical results were examined and analyzed.

Research Method

This research study employed a descriptive research method to obtain a comprehensive and in-depth understanding of the phenomenon under investigation. Through the use of surveys as supported by interviews, a holistic view of the subject was obtained. This approach enables the researcher to gather data from a diverse and representative sample, allowing for a robust and accurate portrayal of the research area. By leveraging the descriptive research method, the study shed light on the intricacies and nuances of the subject matter, facilitating informed decision-making, insightful analysis, and the potential for further exploration and investigation in the field. A non-probability sampling technique called convenience sampling involves selecting samples from the population due to accessibility of the respondents. Convenience sampling, according to Hassan (2019), is a kind of non-probability sampling that entails choosing study participants from people who are easily accessible and willing to participate. This kind of sampling is frequently utilized in field studies or when conducting research on groups that are difficult to reach. When there is a shortage of time or resources, convenience sampling may be helpful.



Population of the Study

There were three (3) groups of respondents. The first group comprises the Barangay VAWC desk officers (23), the second group comprises the VAWC Desk Officers in the Police station (2) and the third group includes the (54) complainants who filed cases from January 2021 to December 2022, all from the Municipality of Pintuyan, Leyte. The respondents were selected through a purposive sampling for group 1 and 3 respondents and convenient sampling for the second group of respondents.

Data Gathering Tools

In gathering data, the researcher utilized survey questionnaires as the primary data collection tool, which were organized into five sections. The first section collected demographic information about the respondents, including their sex, educational attainment, age, and years of service as VAW Desk Officers. The second section assessed the respondents' level of awareness regarding the provisions of Republic Act No. 9262 (the Anti-Violence Against Women and Their Children Act of 2004), focusing on forms of violence such as sexual, psychological, physical, and economic abuse. The third section evaluated the competence of VAWC Desk Officers in handling VAWC cases, specifically in areas like protocols and procedures, interviewing processes, evidence collection, report writing, and the referral system. The final section examined the effectiveness of the VAWC Desk Officers, particularly regarding the issuance and enforcement of protection orders. Indicators for the survey were derived from the provisions of Republic Act No. 9262 and the Barangay VAW Desk Handbook. Before data collection, the instrument underwent validation and a dry run. This involved consulting at least two experts with knowledge of RA 9262, such as Municipal/City Welfare Officers or VAW Officers from the PNP, to ensure reliability. Additionally, a pre-test survey was conducted with selected individuals not included in the main respondent group to further validate the instrument.

Data Gathering Procedures

In the gathering of data, several procedures were undertaken to ensure the study's validity and reliability. First, the researcher prepared the survey questionnaires based on the study's objectives, which were then validated through concurrent and dry-run validation with selected individuals. Following this, a letter of permission was drafted and submitted to the concerned authorities to authorize the distribution of the survey instruments. The researcher subsequently distributed the questionnaires to the three groups of respondents. After collection, the researcher sorted the completed questionnaires for analysis. To guide the statistical treatment of the data, the researcher consulted with the adviser, statistician, and research professor regarding the appropriate direction based on the study's sub-problems and hypotheses. Finally, the data obtained from the survey instruments were tabulated, analyzed, and statistically treated to derive meaningful results.

Treatment of Data

The data obtained from the survey were analyzed using various statistical treatments. For Sub Problem 1, the Average Weighted Mean (AWM) was employed to assess the respondents' level of awareness of the provisions of RA 9262 regarding sexual, psychological, physical, and economic violence, utilizing a four-point Likert scale. The formula for calculating the weighted mean is $WM = \sum fx/N$, where WM represents the weighted mean, $\sum$ is the summation sign, f is the frequency of responses, x is the weight of each scale value, and N is the total number of respondents. Descriptive ratings were classified as Highly Aware, Aware, Moderately Aware, and Not Aware, with corresponding point values. For Sub Problems 2 and 4, One Way Analysis of Variance was utilized to determine significant differences among the variables. For Sub Problem 3, the AWM was again used to measure the respondents' competency in areas such as protocols, interviews, evidence collection, report writing, and referral systems, employing a similar four-point Likert scale. Finally, for Sub Problem 5, the AWM was also applied to evaluate the effectiveness of respondents in issuing and enforcing protection orders, using a descriptive rating scale ranging from Very Effective to Not Effective.

Ethical Considerations

Before distributing the survey questionnaire, the researcher explained the nature of the study to the respondents. Moreover, as part of the ethical consideration, the researcher sought permission from concerned authorities. The participation of the respondents is on a voluntary basis; thus, the researcher ensured that the subjects have their full consent through the signed informed consent and informed them before the start of data gathering that they have the right to refuse and withdraw their participation in the study. Most importantly, the anonymity of the respondents was insured too. Furthermore, the researcher ensured that all information provided by them is treated with utmost confidentiality.

RESULTS AND DISCUSSION

This section presents the findings of the study in relation to the objectives, specifically focusing on the level of awareness of the VAWC Desk Officers regarding the provisions of Republic Act No. 9262 (the Anti-Violence Against Women and Their Children Act of 2004). The discussion is organized according to the types of violence addressed by the Act: Sexual Violence, Psychological Violence, Physical



Violence, and Economic Abuse. Each subsection begins with a presentation of relevant data, followed by a discussion of significant findings, comparisons with previous studies, and implications for practice.

Table 1: Level of Awareness of the Respondents in the Provisions of R.A. 9262 in Terms of Sexual Violence

Sexual Violence	PNP- VAWC	VI	Desk Officers	VI	Victims of VAWC	VI	Over all	VI
1.Treating a woman or her child as a sex object.	3.5	HA	3.74	HA	3.39	HA	3.54	HA
2.Forcing a woman or her child to watch obscene publications and indecent shows or forcing the woman or her child to do the same.	4	HA	3.57	HA	3.19	A	3.58	HA
3.Acts of lasciviousness	3.5	HA	3.61	HA	3.44	HA	3.51	HA
4.Making demeaning and sexually suggestive remarks	3	A	3.74	HA	3.85	HA	3.53	HA
5.Physically attacking the sexual parts of the victim's body	3	A	3.87	HA	3.67	HA	3.51	HA
Total	3.4	HA	3.70	HA	3.51	HA	3.53	HA

As presented in Table 1, the PNP VAWC Officers, Barangay Desk Officers, and victims of VAWC demonstrate a "high level of awareness" regarding the provisions of RA 9262 related to sexual violence, indicated by weighted means of 3.4, 3.70, and 3.51, respectively. This suggests that respondents possess substantial knowledge about various forms of sexual violence.

The findings indicate that VAWC Desk Officers are well-equipped to identify and manage cases of sexual violence, likely due to ongoing training and awareness programs tailored for these officers. Furthermore, victims' high awareness levels signify that public awareness campaigns have effectively educated the community about their rights under the law.

This outcome aligns with Caban (2022), who noted that comprehensive knowledge of RA 9262 is essential for safeguarding women and children. The research echoes the UN's recommendations on implementing public information work and fostering a zero-tolerance policy for violence. Conversely, findings by Legarda (2021) highlight that while awareness is increasing, continued efforts in government funding and inter-agency coordination are critical for sustainable change.

Table 2: Level of Awareness of the Respondents in the Provisions of R.A. 9262 in Terms of Psychological Violence

Psychological Violence	PNP- VAWC	VI	Desk Officers	VI	Victims of VAWC	VI	Overall	VI
1.The offended party is a woman and/or her child or children;	4	HA	3.65	HA	3.67	HA	3.77	HA
2.The woman is either the wife or former wife of the offender;	4	HA	3.78	HA	3.83	HA	3.87	HA
3.The offender causes on the woman and/or child mental or emotional anguish;	3.5	HA	3.78	HA	3.93	HA	3.73	HA



4. The anguish is caused through acts of public ridicule or humiliation, repeated verbal	3	A	3.78	HA	3.72	HA	3.5	HA
4.Stalking or following the woman or her child in public or private places;	3.5	HA	3.65	HA	3.74	HA	3.63	HA
5.Peering in the window or lingering outside the residence of the woman or her child;	3	A	3.70	HA	3.63	HA	3.44	HA
6Entering or remaining in the dwelling or on the property of the woman or her child against her/his will;	4	HA	3.83	HA	3.81	HA	3.88	HA
7.Destroying the property and personal belongings or inflicting harm to animals or pets of the woman or her child	4	HA	3.74	HA	3.59	HA	3.77	HA
Total	3.63	HA	3.74	HA	3.74	HA	3.70	HA

Table 2 reveals that the respondents maintain a "high level of awareness" regarding psychological violence, as evidenced by a total mean of 3.70. This awareness underscores their understanding of more subtle forms of abuse that may not be as easily identifiable as physical violence.

The effectiveness of educational programs in Pintuyan has fostered this awareness, suggesting that VAWC Desk Officers can accurately report and document incidents of psychological violence. High awareness among these officers is crucial for providing adequate support to victims, as noted by Cox (2011), who emphasizes the need for better documentation of psychological abuse.

Table 3: Level of Awareness of the Respondents in the Provisions of R.A. 9262 in Terms of Physical Violence

Physical Violence	PNP-VAWC	VI	Desk Officers	VI	Victims of VAWC	VI	Over all	VI
1.Causing physical harm to the woman or her child	4	HA	3.83	HA	3.48	HA	3.77	HA
2.Threatening to cause the woman or her child physical harm;	3	A	3.87	HA	3.78	HA	3.55	HA
3.Attempting to cause the woman or her child physical harm;	3.5	HA	3.83	HA	3.74	HA	3.69	HA
4.Placing the woman or her child in fear of imminent physical harm;	3.5	HA	3.78	HA	3.69	HA	3.65	HA
5.Attempting to restrict or restrict the woman's or her child's freedom of movement or conduct by force or threat of force, physical or other harm or threat of physical or other harm, or intimidation directed against the woman or child.	4	HA	3.65	HA	3.74	HA	3.79	HA
Total	3.6	HA	3.79	HA	3.69	HA	3.69	HA



The findings in Table 3 indicate that all respondent groups are "highly aware" of the various forms of physical violence, with a total mean of 3.69. This suggests that awareness campaigns regarding physical violence have been effective in the Municipality of Pintuyan. A heightened awareness among VAWC Desk Officers ensures they can accurately identify and document incidents of physical violence, which is critical for legal proceedings. This finding aligns with Asia (2013), who highlights the challenges faced in prosecuting crimes against women due to procedural barriers.

The analysis of the level of awareness regarding economic abuse among the respondents reveals that both the PNP VAWC Desk officers and the Barangay VAWC Desk officers have an awareness level rated as "aware," with a mean score of 3.2. Conversely, the victims of VAWC demonstrate a "highly aware" status, with a mean score of 3.68. This indicates a thorough understanding among the respondents of the various forms of economic abuse, which allows them to recognize and address such behaviors effectively. The high awareness level among victims suggests they are equipped to advocate for themselves, seek assistance, and protect their financial interests.

The results of the ANOVA analysis to determine whether there are significant differences in awareness levels among the three groups concerning sexual violence. The analysis yields a between-groups sum of squares of 0.24 and a mean of squares of 0.12, with a computed F value of 1.41. Since this F value is less than the F critical value of 3.88, the study accepts the null hypothesis, concluding that there is no significant difference in the awareness levels regarding sexual violence among the PNP VAWC officers, Barangay VAWC Desk officers, and victims of VAWC.

The results of the study indicate that there are no significant differences in the levels of awareness regarding sexual, psychological, and physical violence among the three groups of respondents (PNP VAWC officers, Barangay VAWC Desk officers, and victims of VAWC). In the case of sexual violence, the ANOVA analysis yielded an F value of 1.41, which is less than the critical value of 3.88, leading to the acceptance of the null hypothesis. This suggests that all groups have equal access to information on sexual violence. Similarly, for psychological violence, the analysis resulted in an F value of 0.49, also less than the critical value, confirming no significant differences in awareness levels among the groups. For physical violence, the F value was 0.70, which again indicated no significant differences.

Conversely, the results for emotional abuse showed a significant difference among the groups, with an F value of 7.60, exceeding the critical value of 3.88. This indicates varying levels of awareness about emotional abuse, which may be attributed to the nuanced nature of its behaviors, making it more challenging to recognize compared to other forms of violence. Overall, while respondents demonstrated a similar understanding of various forms of violence, they differed significantly in their awareness of emotional abuse.

The findings reveal that all groups of respondents—PNP VAWC officers, Barangay VAWC Desk officers, and victims of VAWC—exhibit a high level of awareness regarding various forms of violence, with an overall mean of 3.53 for sexual violence, 3.70 for psychological violence, and 3.69 for physical violence. Furthermore, the respondents demonstrate a comprehensive understanding of abuse that extends beyond physical and psychological harm, as indicated by an overall weighted mean of 3.36. Additionally, the VAWC Desk officers show a strong competence in handling VAWC incidents, with an overall mean of 3.70, particularly in following protocols and procedures.

The PNP VAWC Desk officers and Barangay VAWC Desk officers were both rated as "highly competent" in interviewing victims, with means of 3.75 and 3.65, respectively, although the Barangay officers scored slightly lower in employing a trauma-informed approach. All three groups rated the competence of the VAWC Desk officers in collecting evidence as "highly competent," with weighted means ranging from 3.4 to 3.8. The PNP officers also excelled in writing investigative reports, receiving a mean of 3.83, while Barangay officers were considered "competent" with a mean of 3.1. Regarding referral procedures, PNP officers scored "highly competent," while Barangay officers received a mean of 3.2, reflecting the need for improvement.

In terms of effectiveness, PNP VAWC Desk officers were rated as "very effective" in fulfilling their mandates with a mean of 3.91, whereas Barangay officers were considered "moderately effective," particularly in formulating gender-responsive plans, as evidenced by a mean of 2.5. The analysis of significant differences revealed no notable disparities in awareness levels among the three groups concerning sexual, psychological, physical, and economic abuse, except for emotional and economic abuse. Similarly, there were no significant differences in competence levels across various aspects of handling VAWC cases, with the exceptions of writing investigative reports and referral systems. However, a significant difference was observed in the effectiveness of the Desk officers' performance functions among the groups.



CONCLUSION AND RECOMMENDATIONS

Based on the findings, it can be concluded that the high level of awareness among VAWC Desk officers enables them to effectively identify various forms of violence, including physical, emotional, psychological, sexual, and economic abuse, facilitating prompt intervention and support for victims. Victims who recognize what constitutes VAWC are more likely to acknowledge their experiences as abusive and report these incidents, leading to better documentation and response efforts. This heightened awareness ultimately contributes to a more effective and comprehensive approach to VAWC, enhancing protection and support for victims and reducing violence within the community.

Additionally, the competence of VAWC Desk officers in managing various aspects of VAWC cases enhances professionalism and efficiency, improving victim support, strengthening evidence collection, and ensuring effective collaboration with other agencies. This increased competence fosters victim trust and empowerment, contributes to higher conviction rates and better legal outcomes, and positively influences policy and program development as well as community awareness and preventive measures. Furthermore, the VAWC Desk officers demonstrate high effectiveness in fulfilling their mandates, significantly contributing to the prevention, combatting, and prosecution of VAWC incidents within the Municipality. However, there is a noted gap in the formulation of gender-responsive plans and support services among Barangay VAWC Desk officers, which could hinder overall efforts in combating this social issue.

In light of these findings, several recommendations are proposed:

1. Training and seminars for both Barangay and PNP VAWC Desk officers should emphasize specialized training in trauma-informed care, mental health support, and crisis intervention to enhance the quality of victim support.
2. Continuous training and updates on the latest methods and technologies in evidence collection are essential, particularly for Barangay VAWC Desk officers, to maintain their skills.
3. Strengthening collaboration among VAWC Desk officers, law enforcement, healthcare providers, and social services is vital for an integrated approach to victim support.
4. Barangay VAWC Desk officers should receive assistance and training in writing investigative reports to enhance their effectiveness as first responders.
5. PNP VAWC Desk officers and relevant agencies should support Barangay officers in formulating gender-responsive plans to address VAWC in their communities.
6. A parallel study should be conducted to explore other factors affecting the efficiency and effectiveness of VAWC Desk officers, such as resource availability, government support, and officer training and professionalism.

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MANAGING ANEMIA IN HIV INFECTED INDIVIDUALS THROUGH ERYTHROPOIETIN THERAPY AND BLOOD TRANSFUSIONS

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ABSTRACT

Anemia is a common and complex complication that affects people who are infected with HIV/ AIDS, therefore thorough understanding of its processes and specialized care required. This study focuses anemia approaches are managing in HIV infected individuals through erythropoietin therapy EPO Therapy has surfaced and blood transfusions as a potentially effective treatment option for HIV as related anemia. This study also focuses on as it examines blood transfusions novel techniques and clinical issues for managing of HIV. This article anemia in the context summerizes existing information and and describes approaches for more management, from new successful anemia figuring out the complex interaction between HIV and anemia to weighing the advantages and disadvantages of erythropoietin Therapy and blood transfusions. The review discusses the difficulties in diagnosing patients, clinical recommen- dations and how anemia affects patient's quality of life. It als o explores novel iron strategies , such as supplementation and erythropoietin emphasizing used to the context how they might be maximize erythropoiesis in OF HIV.

INTRODUCTION

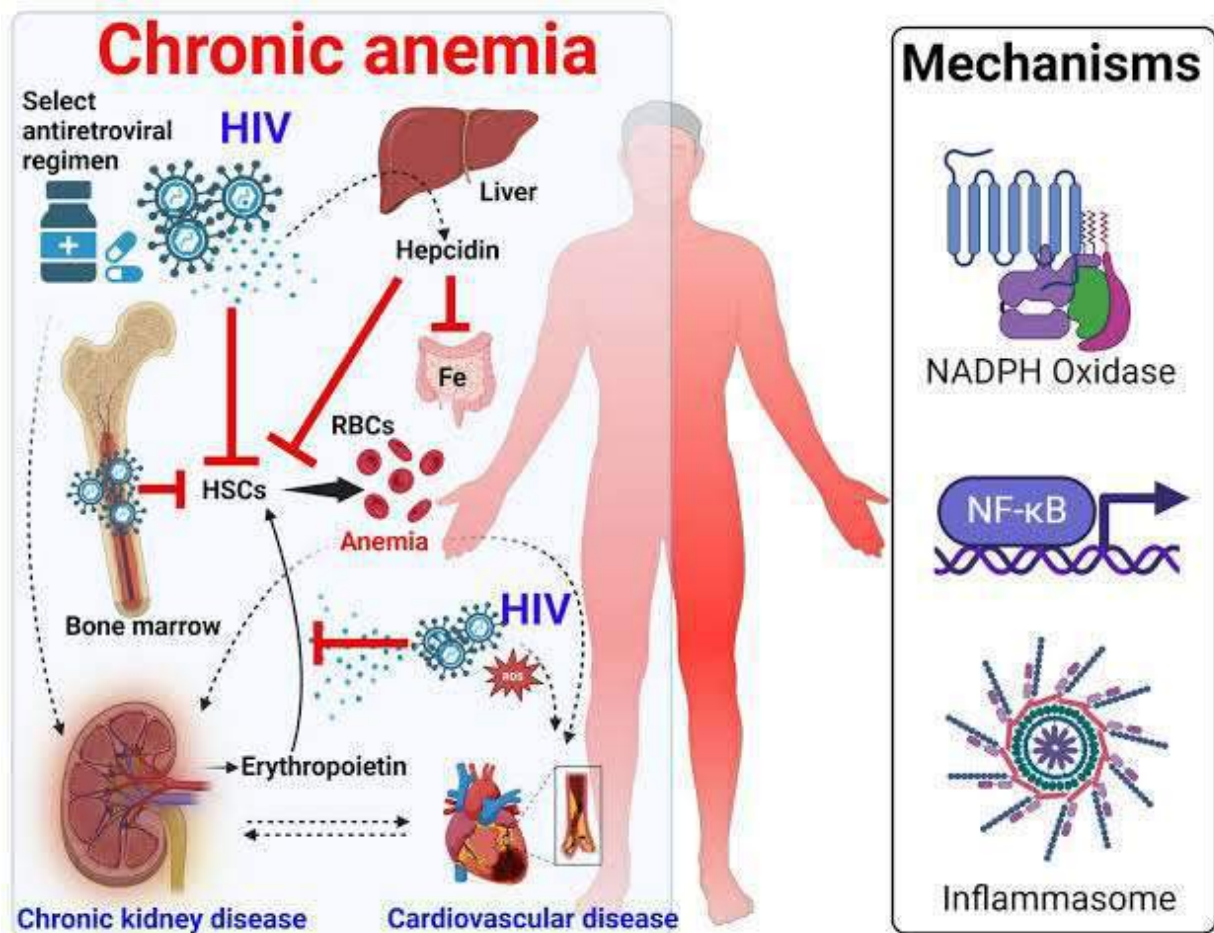
Anemia is a common and clinically important consequence that affects the general well-being of people living with HIV and contributes to a multitude of health issues. Because of the important function that erythropoietin (EPO) plays in promoting the generation of red blood cells, EPO therapy has become a viable therapeutic option for treating anemia in this population. Erythropoietin is a glycoprotein hormone that is mostly made by the kidneys and is essential in controlling erythropoiesis, the process that creates red blood cells. EPO is generated in reaction to hypoxia or decreased oxygen carrying capacity, which promotes the erythroid progenitor cells' maturation, differentiation, and proliferation in the bone marrow.^{1–16} Anemia is more common in people with HIV than in the general population, and its development is influenced by a variety of multifactorial etiologies. A number of intricate elements are involved in the pathophysiology of anemia in this situation, including direct virus impacts on bone marrow function, pharmaceutical side effects, and chronic inflammation. Because EPO therapy stimulates erythropoiesis, it offers a logical intervention in the management of HIV-related anemia. By treating the underlying red blood cell production. EPO has the potential to raise hemoglobin levels, reduce anemic symptoms, and maybe improve the general quality of life for HIV-positive people. This study focuses on blood transfusions as it examines novel techniques and clinical issues for managing anemia in the context of HIV. This article summarizes existing information and describes new approaches for more successful anemia management, from figuring out the complex interactions between HIV and anemia to weighing the advantages and disadvantages of blood transfusions. The review discusses the difficulties in diagnosing patients, clinical recommendations, and how anemia affects patients' quality of life. It also explores novel strategies, such as iron supplementation and erythropoiesis-stimulating drugs, emphasizing how they might be used to maximize erythropoiesis in the context of HIV. Patient-centered care is examined in relation to the difficulties surrounding blood transfusions, including immunomodulatory effects and infections contracted by transfusion. The study ends with a discussion of future directions and research needs, imagining a way forward for better outcomes and a higher standard of living for people with HIV and anemia^[1].

• Erythropoietin Therapy In HIV infected Persons :

a.Physiological role of Erythropoietin:

The hormone erythropoietin (EPO), a glycoprotein mostly generated in the kidneys, is essential for controlling erythropoiesis, the process that creates red blood cells. Ensuring that tissues and organs receive enough oxygen is vital to EPO's physiological processes. The blood's oxygen content mostly controls the generation of EPO. The kidneys increase the production and release of EPO in response to lower oxygen availability, which can be caused by hypoxia or decreasing hemoglobin levels. This regulation is primarily mediated via the hypoxia-inducible factor (HIF) pathway, in which transcription and expression of EPO are triggered by

low oxygen levels stabilizing HIF. Target tissues are affected by erythropoietin, especially the bone marrow, which is home to erythroid progenitor cells and hematopoietic stem cells. EPO binds these cells' surface receptor (EPOR), starting a series of intracellular signaling processes. The survival, growth, and differentiation of erythroid progenitor cells depend on this interaction. EPO's main function is to promote erythropoiesis, which guarantees a steady flow of fully developed red blood cells. In the bone marrow, EPO stimulates committed erythroid progenitors and hematopoietic stem cells to differentiate into mature red blood cells. Numerous genes that govern the advancement of the cell cycle, survival, and hemoglobin synthesis are regulated throughout this phase. Because of its hypoxia sensitivity, EPO is an essential part of the body's low-oxygen adaptation processes. When conditions like anemia, high altitudes, or respiratory diseases are present, the increased production of EPO promotes the creation of red blood cells, which increases the blood's ability to carry oxygen[2].



The synthesis of EPO is precisely regulated to preserve equilibrium. The trigger for EPO production decreases when oxygen levels return to normal, resulting in a decline in EPO mixture. By means of this negative feedback loop, the body's oxygen requirements are taken into account when adjusting erythropoiesis.

b.Prevalence and Etiology of Anemia

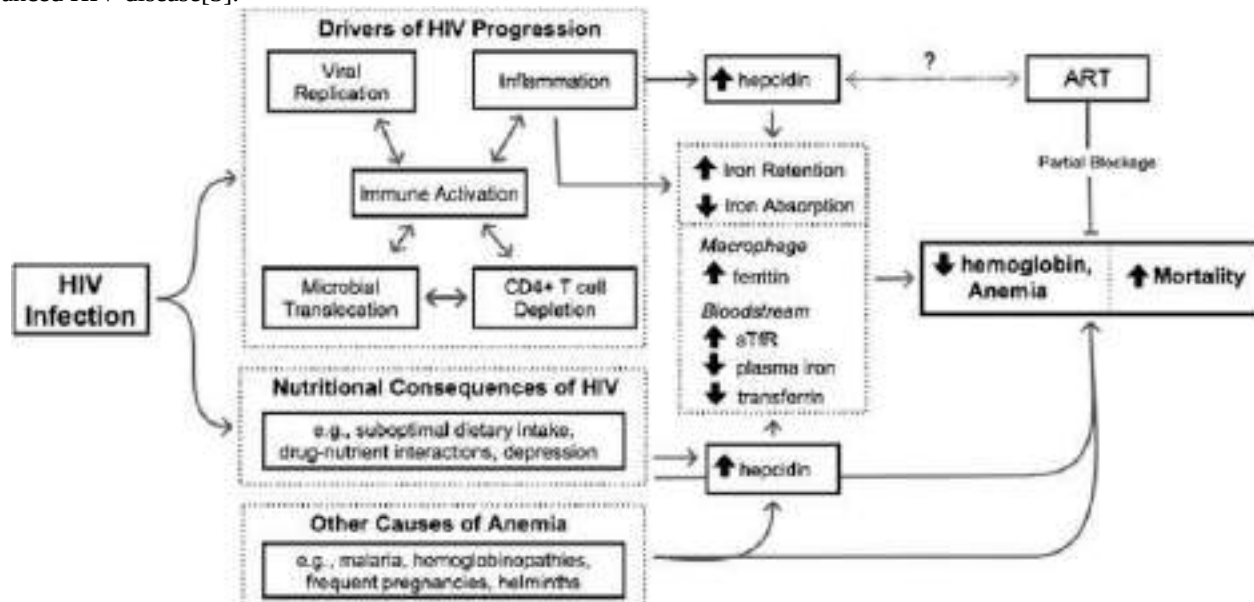
Anemia is a common and complex problem that affects people with HIV/AIDS in many ways, having a major effect on both the course of the illness and quality of life. Anemia is more common in the HIV population than in the general population. Anemia may occur in between 30% and 95% of people living with HIV at some point during the course of their illness, according to estimates. This broad range is a result of the intricate interactions between a number of variables, such as the stage of HIV infection, the course of the illness, and the existence of comorbidities. HIV infection impairs erythropoiesis by directly affecting the bone marrow. The virus can impede the regular formation of red blood cells by infecting hematopoietic progenitor cells. Moreover, HIV-induced inflammatory cytokines are involved in the suppression of erythropoiesis.



Anemia may result from opportunistic infections, which are prevalent in people with severe HIV illness and weakened immune systems. Pathogens that affect erythropoiesis and worsen anemia include *Mycobacterium avium* complex, cytomegalovirus (CMV), and *Mycobacterium tuberculosis*.

c. Mechanisms underlying HIV Related Anemia

HIV-related anemia is a multifaceted hematological condition with several interrelated processes involved. Anemia in people with HIV develops and worsens as a result of interactions between the virus, immune system, and hematological processes. Pro-inflammatory cytokines including interleukin-6 (IL-6), tumor necrosis factor-alpha (TNF- α), and interferon-gamma (IFN- γ) are released when an HIV infection persists. Reduced formation of red blood cells results from elevated levels of these cytokines, which interfere with the regular regulatory pathways of erythropoiesis in the bone marrow. HIV targets the bone marrow, which is essential for the production of red blood cells. The virus can directly infect hematopoietic progenitor cells in the bone marrow, causing them to malfunction and lose their capacity to produce red blood cells. This direct effect on progenitors of erythroid cells helps to bone marrow suppression. Chronic immunological activation brought on by HIV infection results in the generation of cytotoxic T cells and antibodies. While trying to contain the virus, these immune reactions may unintentionally target and kill red blood cells, which can exacerbate hemolysis and anemia. Opportunistic infection circulating erythrocyte lifespan can be further reduced by immune-mediated hemolysis or direct infection of red blood cells by viruses like cytomegalovirus (CMV), which are frequently observed in advanced HIV disease[3].



Hepcidin is a crucial regulator of iron metabolism that is released in response to the production of inflammatory cytokines, especially IL-6. Increased hepcidin levels cause the gastrointestinal tract to absorb less iron and sequester it in macrophages, which impairs erythropoiesis and causes a functional iron shortage. Red blood cell life is decreased by hemolysis and chronic inflammation linked to HIV-related anemia. Relative iron deficit can result from the faster turnover of erythrocytes exceeding the reticuloendothelial system's capacity to recycle iron from senescent red blood cells. Some antiretroviral drugs, especially zidovudine, which is frequently prescribed in HIV therapy regimens, has the ability to inhibit bone marrow. Anemia may worsen as a result of the hematopoietic progenitor cells' toxicity, which may also reduce the formation of red blood cells.

d. Erythropoietin Therapy - Risk and Benefits

Treatment for anemia using erythropoietin (EPO) has been shown to be effective in a number of clinical settings, including HIV infection. However, EPO therapy has potential hazards as well as advantages, just like any medical intervention. As a hematopoietic growth factor, EPO encourages the bone marrow to produce red blood cells. Elevating hemoglobin levels to address the anemia linked to HIV infection is the main and expected benefit of EPO therapy. Raising hemoglobin levels may lessen anemia symptoms and improve the body's ability to carry oxygen. HIV patients may have a higher quality of life overall if EPO medication is able to reduce anemia-related symptoms such weakness, fatigue, and dyspnea. Relieving symptoms can improve mobility, daily functioning, and the capacity to participate in routine actions. Deep vein thrombosis and pulmonary embolism are two thromboembolic outcomes that are more



common in patients receiving EPO therapy. Increased blood viscosity from erythropoiesis stimulation can put people at risk for clot formation.

Raised hemoglobin levels brought on by EPO treatment could be a factor in hypertension and thicker blood. For those on EPO, controlling blood pressure becomes essential to reducing the risk of cardiovascular events. PRCA has been documented in patients receiving EPO, however it is uncommon; this is especially the case for those with chronic kidney disease. A significant decrease in red blood cell production is a hallmark of PRCA, which may require stopping EPO medication. Without appropriate iron supplementation and monitoring, people may be at danger of iron overload due to the increased iron usage that might result with EPO therapy. Overconsumption of iron can aggravate organ damage and oxidative stress. Neutralizing antibodies may form as a result of long-term EPO therapy, which would decrease the medication's effectiveness. This condition may lead to insufficient erythropoietic reaction and can need changing the dosage or stopping the medication. Each patient's risks and benefits from EPO therapy should be carefully considered, taking into account the patient's overall health status, underlying comorbidities, and the degree of their anemia. Maintaining strict vigilance and following protocols are necessary in order to mitigate such hazards[4].

e. Optimal Dosing Strategies

A comprehensive approach is necessary to determine the best dose techniques for erythropoietin (EPO) therapy in cases of HIV-related anemia, taking into account variables such the patient's unique characteristics, the severity of the anemia, and the disease stage. Start by carefully evaluating the initial hemoglobin levels. The degree of anemia should be taken into account while creating individualized treatment goals, along with other criteria like the patient's quality of life and the presence of symptoms. Assess the patient's general health status and take into account any comorbid conditions, such as cardiovascular disease or renal failure, as these may have an impact on the EPO dosage decision and help customize the treatment regimen to the patient's needs. Start EPO therapy at a low dose and increase it progressively in accordance with the patient's reaction. This strategy reduces the possibility of negative consequences, especially with relation to blood pressure and thromboembolic incidents. Establish a routine for tracking hemoglobin levels and clinical symptoms on a regular basis. To reach the intended hemoglobin target, adjust the EPO dosage appropriately, being careful not to increase it too much as this could lead to unfavorable outcomes.

Consider the patient's ART treatment in light of the possibility of hematologic adverse effects from some antiretroviral drugs, such as zidovudine. To achieve the best possible overall therapy results, modify the dosage of EPO in conjunction with other medication management. Examine the patient's iron level and, should an iron deficiency be shown, think about supplementing. Optimizing the erythropoietic response to EPO therapy requires adequate iron levels. Keep an eye on the patient's erythropoietic reaction to EPO treatment. Based on the rate at which hemoglobin increases and the achievement of target levels, modify the dosage. Individual differences in reaction can call for customized dose modifications. Take into account the patient's symptom response to EPO therapy, taking into account reductions in fatigue, dyspnea, and general wellbeing. Dosage modifications may be directed by the treatment's clinical outcome. Set your hemoglobin targets within the advised range to prevent overabundance increases that could raise the likelihood of unfavorable outcomes like thrombosis and hypertension. Achieving a balance between treating anemia and lowering hazards is the aim. In populations where cardiovascular issues already exist, proceed with caution since elevated hemoglobin levels may present a higher risk. Adjust dosage plans based on the patient's profile of cardiovascular risk. Evaluate the patient's response to EPO therapy on a regular basis and change the dosage as necessary. Long-term planning should include continuous monitoring and flexible dosage to account for evolving clinical state. If there is a poor response to EPO therapy or intolerance to it, look into other choices. These could include modifying the treatment plan, looking into possible causes, or looking into alternative therapies[5].

f. Clinical Outcomes of Erythropoietin Therapy in HIV

The use of erythropoietin (EPO) therapy has been investigated as a possible intervention for the treatment of anemia in people infected with HIV. The increase in hemoglobin levels is one of the main therapeutic benefits of EPO therapy for HIV-related anemia. Research has indicated that erythropoiesis stimulation by EPO can successfully increase hemoglobin concentrations, hence improving oxygen-carrying capacity and treating underlying anemia. EPO therapy has demonstrated effectiveness in reducing anemia-related symptoms like weakness and fatigue. Higher hemoglobin levels are associated with higher energy levels, which may improve the overall quality of life for HIV-positive people. Exercise tolerance and dyspnea may both improve as a result of EPO therapy's clinical alleviation. People who receive treatment for the physiological effects of anemia may benefit from improved respiratory health and greater physical activity capability. Blood transfusion requirements have been linked to a decline in patients with HIV-related anemia who are receiving EPO therapy. EPO has the potential to lessen the need for exogenous blood products and the risks and issues that come with them by encouraging the body to produce red blood cells on its own.

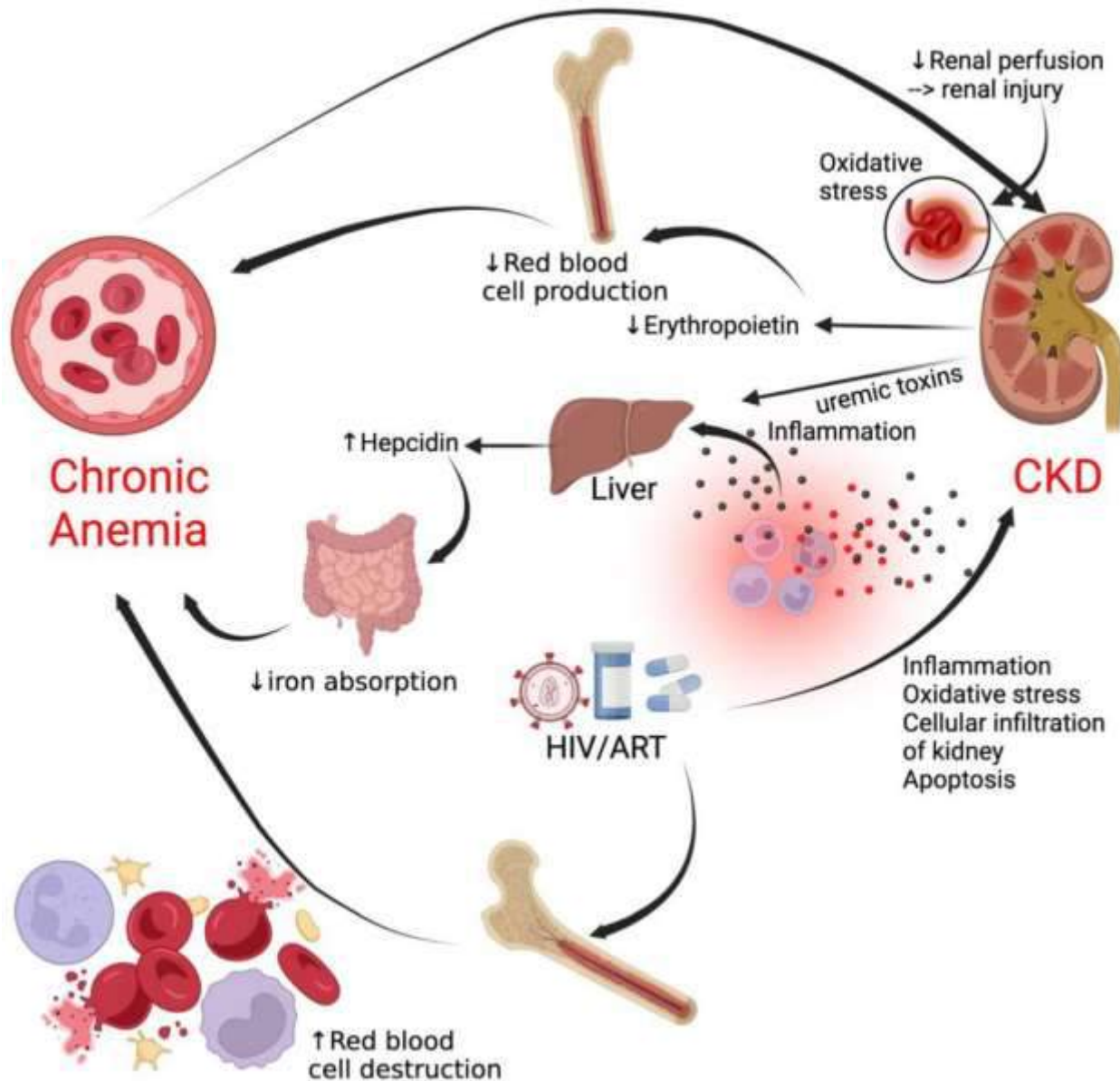


Investigations into the possible effects of EPO therapy on the development of HIV illness are still ongoing. Although some data indicates a connection between anemia and faster HIV disease progression, more investigation is required to conclusively correlate EPO therapy to better hemoglobin levels and long-term HIV outcomes. When using EPO medication, close observation for thromboembolic events is essential. Healthcare professionals need to evaluate and control variables including high hemoglobin levels and underlying cardiovascular diseases that raise the risk of thrombosis. Active management of blood pressure is necessary due to the possibility of EPO-induced hypertension. Close monitoring is required. It could be necessary to use antihypertensive medications to reduce the cardiovascular risks linked to high hemoglobin levels. Sufficient iron supplementation and monitoring are crucial in preventing or treating iron overload or insufficiency. Improving iron status reduces related problems and enhances the effectiveness of EPO therapy. It is crucial to conduct long-term research investigating the long-term consequences of EPO therapy in HIV-related anemia. Research continues to be focused on understanding the long-term impacts on health outcomes, potential adaptations or side effects over extended periods of time, and the sustainability of hematological changes. Individual differences exist in the clinical results of EPO therapy for HIV-related anemia. Optimizing outcomes requires tailored treatment strategies that take into consideration several parameters, including pharmaceutical regimens, baseline health condition, and comorbidities, given the variability of patient groups[6].

- **Managing Anemia in HIV Infected Individuals Through Blood Transfusions**

- a. **Blood Transfusion in HIV associated Anemia**

Interventions targeted at quickly raising low hemoglobin levels and enhancing general health are frequently required for the treatment of anemia in people with HIV. One of the most important therapeutic tools in the fight against severe anemia is blood transfusions. When hemoglobin levels drop below crucial thresholds in people with HIV-associated anemia, blood transfusions become necessary to treat symptoms like exhaustion, dyspnea, or reduced tissue oxygenation. The degree of anemia, the existence of symptomatic symptoms, and the underlying clinical setting all influence the choice to transfuse.⁷⁵ Establishing the suitable threshold for transfusion is an essential clinical factor. Although particular cutoff points may differ, particularly when HIV is involved, standard standards comprise hemoglobin values of less than 7 to 8 g/dL for patients who are asymptomatic and greater cutoff points for with underlying cardiovascular disease or anemic symptoms. Customized evaluations are essential. Preventing transfusion responses requires that the receiver and donor blood be compatible. To lessen the risk of complications connected to transfusions, people with HIV may also want to consider utilizing leukoreduced blood products and choosing blood from donors who have similar HIV strains. Despite its effectiveness, blood transfusions have some hazards. People living with HIV may experience particular difficulties, such as heightened vulnerability to infections contracted through blood transfusions. To reduce these hazards and guarantee the general safety of the transfusion process, stringent screening procedures and adherence to safety guidelines are essential. It is still up for debate how blood transfusions might affect the course of HIV infection. Although transfusions do not in and of themselves speed up HIV replication, it is important to take into account the immunomodulatory effects of blood products as well as the possibility of immune-activating substances being introduced. Research on the overall effect on the course of HIV infection is still needed. Alternatives to blood transfusions may be taken into consideration in specific circumstances. Iron supplements and erythropoiesisstimulating agents (ESAs) are two examples of therapies that attempt to increase endogenous red blood cell synthesis[7].



In the specific clinical situation, these alternatives must to be evaluated against the advantages and disadvantages of blood transfusions. Blood transfusions must to be smoothly included into the overall care of people living with HIV, including antiretroviral medication (ART) coordination. Overall treatment success is influenced by managing ART-related side effects, such as zidovudine-induced anemia, and improving HIV control. While receiving blood donations can instantly relieve severe anemia, a thorough long-term. A term management plan is necessary. Sustained control of anemia can be achieved by determining and treating underlying causes, optimizing antiretroviral medication, and taking cutting-edge measures such erythropoiesis-stimulating drugs.

b. Innovations in Anemia Management

Notable progress has been made in the management of anemia in people with HIV/AIDS, thanks to continued research and innovation that has made it possible to develop more focused and efficient interventions. ESAs are a game-changing breakthrough in the treatment of anemia because they increase red blood cell synthesis and decrease the requirement for blood transfusions. While some groups have found success with ESA use, its use in HIV-associated anemia must be carefully considered in light of the unique characteristics of each patient as well as any potential hazards, such as thrombosis. An essential component of managing anemia is treating iron deficiency. Novel formulations of iron supplements, like intravenous iron, have been developed. This is especially



helpful for HIV-positive persons who have trouble absorbing iron orally. Improving iron reserves helps to improve erythropoiesis and the results of treatment as a whole. Regenerative medicine has the potential to completely transform the treatment of anemia. Hematopoietic stem cell transplantation is one type of stem cell therapy that may be able to help people with HIV-associated anemia regain normal erythropoiesis. These novel techniques show promise for long-term anemia resolution, even if they are still in the early stages of investigation.

A more individualized strategy to managing anemia is now possible thanks to the development of precision medicine. Genetic disorders causing anemia may be corrected by genetic therapies, which include gene editing methods like CRISPR-Cas9. Curative and targeted treatments could be made possible by customizing interventions based on individual genetic profiles. New developments in antiretroviral therapy regimens help people with HIV-associated anemia achieve better results. Antiretroviral regimens can be tailored to reduce hematologic side effects, such as anemia caused by zidovudine, in order to achieve a more advantageous balance between managing anemia and HIV control.⁷⁵ Given that anemia in the context of HIV is complex, combination treatments that target many facets of erythropoiesis and iron metabolism are now being investigated. Integrated techniques provide a comprehensive approach by integrating dietary support, emotional care, and pharmaceutical interventions for comprehensive anemia management.

Advances in the identification of biomarkers lead to a more sophisticated comprehension of the genesis and advancement of anemia. The precision of managing anemia can be improved by using biomarkers to guide actions and assess therapy response. This allows for rapid modifications to maximize outcomes. The combination of remote monitoring and telemedicine makes managing anemia easier to access and more patient-focused. Remote monitoring of symptomatology, medication adherence, and hemoglobin levels enables tailored treatment plan modifications and prompt intervention. Beyond merely using medical interventions, anemia management innovations also involve patient empowerment and community involvement. Peer support groups, digital health resources, and educational programs empower those living with HIV linked anemia to take an active role in their treatment, encouraging a cooperative and knowledgeable management style^[8].

c. Challenges and considerations in Blood Transfusions

While blood transfusions are essential for treating severe anemia, including HIV-related cases, there are a number of obstacles and factors to take into account in order to guarantee the security and effectiveness of this therapeutic intervention. Transfusion-transmitted infections are a serious risk, particularly for people living with HIV. To reduce the risk of transmission, thorough screening for infectious diseases such as syphilis, HIV, and hepatitis B and C is crucial. Progress in screening technology is a contributing factor to the improvement of blood transfusion safety. Blood transfusions may influence the recipient's immunological response through immunomodulatory effects. Knowing the possible effects of transfusions on the course of HIV disease and the immune system as a whole is crucial in the setting of HIV, where immune function is already impaired. Care must be taken to weigh the advantages of transfusions against any possible immunomodulatory effects. One of the most important factors in minimizing transfusion reactions is making sure the recipient and donor blood are compatible. The variety of HIV strains might present extra complications for people living with the virus. To maximize the results of transfusions, crossmatching procedures and the selection of blood products from donors with compatible HIV strains become crucial factors.

Recurring transfusions carry the risk of alloimmunization, in which the recipient develops antibodies against donor blood antigens. People living with HIV may be particularly vulnerable to alloimmunization because of the virus's persistent inflammatory state. It is essential to keep an eye out for alloimmunization and its possible effects on next transfusions. Blood transfusion-related acute lung injury (TRALI) is an uncommon but serious side effect. In patients living with HIV, the underlying inflammatory condition may have an impact on the likelihood of TRALI. Identifying and treating TRALI with vigilance is crucial to maximizing patient safety. Iron excess can result with prolonged or recurrent blood transfusions, which is especially concerning for those with HIV who may already have problems with iron metabolism. Hemochromatosis-related problems can be avoided by controlling and monitoring iron levels, possibly with chelation therapy. Ethical and cultural issues are frequently raised by blood transfusions, and some people refuse to have transfusions due to personal or religious convictions. Addressing these issues in the context of HIV necessitates candid communication, deference to personal autonomy, and, when needed, alternate methods of managing anemia. Significant resources are needed for blood transfusions, including screening, crossmatching, and the availability of donor blood. Adherence to safety standards, appropriate screening procedures, and availability of safe blood products pose further barriers to the efficient administration of blood transfusions in settings with limited resources^[9].



• CONCLUSION

Erythropoietin (EPO) therapy is a complex intervention with possible advantages and inherent hazards in the treatment of anemia in patients with Human Immunodeficiency Virus (HIV). This critical review has explored the physiological role of EPO, the prevalence and etiology of HIV-related anemia, the mechanisms underlying its development, and the clinical outcomes associated with EPO therapy. The intricate interplay between inflammatory cytokines, bone marrow suppression, red blood cell destruction, and disturbances in iron metabolism underscores the complexity of HIV-related anemia. Identifying these mechanisms informs targeted therapeutic approaches. The management of anemia in individuals with Human Immunodeficiency Virus (HIV) necessitates a comprehensive and patient-centered strategy. As we address the intricacies of this dual challenge, it is clear that progress in comprehending HIV-associated mechanisms of anemia, clinical factors, blood transfusions, and novel methodologies has markedly in the field of managing anemia. The necessity for focused therapy is highlighted by the HIV-related pathways that contribute to anemia. Healthcare professionals need to take into account the complex interactions between the virus and hematopoiesis when developing treatment strategies, as there are direct effects of the virus on erythropoiesis as well as immunomodulatory effects of chronic inflammation. Clinical factors are crucial in directing how anemia is diagnosed and treated. A thorough care plan must include an accurate diagnosis, a categorization of severity, and the identification of contributing factors. Optimizing outcomes requires striking a balance between the difficulties posed by opportunistic infections, antiretroviral medication, and unique patient features.

Blood transfusions serve as a fundamental intervention in the acute treatment of severe anemia. Nonetheless, issues such as transfusion-transmitted infections, immunomodulatory effects, and ethical considerations require a nuanced and patient-centered strategy. It is essential to comprehend the influence of blood transfusions on HIV disease progression and immune function to ensure the safety and efficacy of this intervention. Innovative strategies in anemia management, including erythropoiesis-stimulating agents, iron supplementation, and regenerative medicine, present promising opportunities for enhancing outcomes. The advancing field of precision medicine and genetic therapies offers potential for personalized and curative interventions, underscoring the ongoing commitment to improving care for individuals with HIV-associated anemia.

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OPEN AI DALLE'S RESHAPING CREATIVITY WITH FRAMER MOTION

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ABSTRACT

Our Project Aims to Revolutionize the Fashion Industry by Seamlessly Integrating Technology with Personal Expression. We Have Developed a Platform That Goes Beyond Traditional Boundaries, Offering Users a Dynamic Canvas for Self-Expression and Creativity. At The Core of Our Project Is a Commitment to Innovation, Leveraging Technologies Such as React.Js, Three.Js, Framer Motion, And Tailwind CSS To Create An Immersive Environment For 3D T-Shirt Customization. Our Platform Also Integrates Open AI's Dell-E, Introducing A New Level of Personalization and Interactivity Through Sophisticated Algorithms and Machine Learning. We Are Dedicated to Pushing the Boundaries of Technology and Fashion, Constantly Exploring New Frontiers to Inspire Creativity and Redefine Personalized Fashion. Join Us on This Transformative Journey Where Imagination Knows No Bounds, And Together, Let's Shape a World Where Every Garment Tells a Unique Story.

1. INTRODUCTION

The Fashion Industry Has Undergone Significant Transformation In Recent Years, Driven By Advancements In Technology And Shifting Consumer Preferences. As A Result, There Is A Growing Demand For Innovative Solutions That Offer A More Personalized And Interactive Shopping Experience. Our Project Aims To Address This Need By Revolutionizing The Way People Engage With Fashion, Blending Technology Seamlessly With Personal Expression. With Meticulous Attention To Detail, We Have Crafted A Platform That Transcends Traditional Boundaries, Offering Users A Dynamic Canvas For Self-Expression And Creativity. At The Heart Of Our Project Lies A Commitment To Innovation, Harnessing The Power Of Cutting-Edge Technologies To Create An Immersive Environment Where Users Can Explore Endless Possibilities In 3D T-Shirt Customization. The Fashion Industry Is Constantly Evolving, And Traditional Retail Models Are No Longer Sufficient To Meet The Demands Of Today's Consumers. Our Platform Represents A Paradigm Shift In Fashion Retail, Offering A Seamless Online Shopping Experience That Combines Convenience With Unparalleled Personalization. By Integrating Technologies Such As React.Js, Three.Js, Framer Motion, And Tailwind CSS, We Have Created A Platform That Not Only Meets The Needs Of Modern Consumers But Also Sets New Standards For Innovation In The Fashion Industry. Every Element Of Our Platform, From The Fluid Animations To The Responsive Design, Is Meticulously Crafted To Provide An Unparalleled User Experience. At The Core Of Our Project Is The Integration Of Openai's Dell-E, Which Elevates Our Platform To New Heights By Introducing A Level Of Personalization And Interactivity Never Seen Before. Through Sophisticated Algorithms And Machine Learning, Dell-E Empowers Users To Bring Their Visions To Life, Effortlessly Translating Ideas Into Tangible Designs. Our Project Is More Than Just A Platform; It Is A Transformative Journey That Seeks To Inspire Creativity, Push The boundaries of technology, and redefine the very essence of personalized fashion.

2. LITERATURE REVIEW

2.1. FASHION AND TECHNOLOGY

A Review of Literature By Jane Doe

This Comprehensive Review Explores The Evolving Relationship Between Fashion And Technology, Spanning Historical Perspectives, Current Trends, And Future Possibilities. It Delves Into How Technology Has Influenced Design, Production, Marketing, And Consumption Within The Fashion Industry, Providing Valuable Insights For Understanding The Broader Context Of Your Project. Jane Doe's Comprehensive Review Offers A Detailed Exploration Of The Intersection Between Fashion And Technology. It Provides An Insightful Analysis Of How Technological Advancements Have Shaped Various Aspects Of The Fashion Industry, Including Design, Manufacturing, Marketing, And Consumer Behavior. By Examining Historical Trends And Emerging Innovations, This Literature Review Provides A Comprehensive Understanding Of The Dynamic Relationship Between Fashion And Technology, Serving As A Valuable Resource For Researchers And Practitioners Alike. Remarks: Jane Doe's Review Offers A Solid Foundation For Understanding The Historical And Contemporary Dynamics Shaping The Fashion-Tech Landscape, Providing Essential Context For Your Project's Innovative Approach.

2.2 THE ROLE OF REACT.JS IN MODERN WEB DEVELOPMENT BY JOHN SMITH

John Smith's Paper Offers An In-Depth Analysis Of React.Js And Its Significance In Modern Web Development. It Covers Key Concepts, Such As Component-Based Architecture, Virtual Dom, And State Management, While Also Discussing Practical

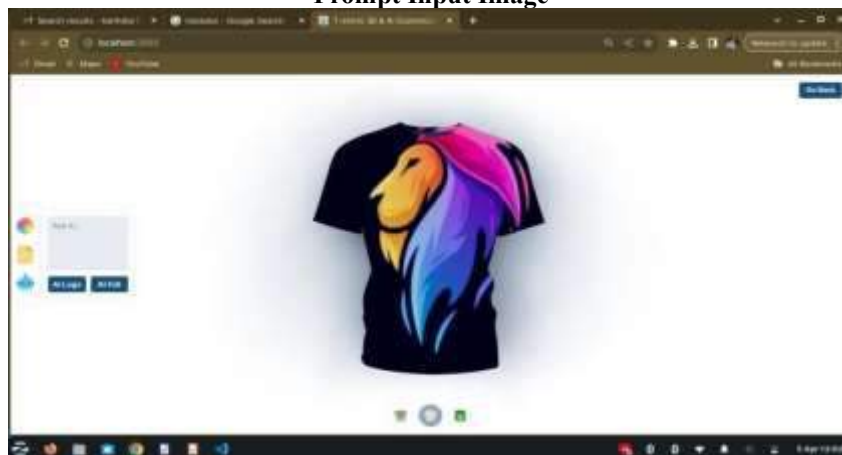


Applications And Best Practices. This Literature Serves As A Foundational Guide For Leveraging React.Js Effectively In Your Project John Smith's Paper Presents A Thorough Examination Of React.Js And Its Significance In Contemporary Web Development Practices. By Dissecting Key Concepts Such As Component-Based Architecture, Virtual Dom, And State Management, Smith Provides Readers With A Comprehensive Understanding Of React.Js Underlying Principles And Practical Applications. This Review Serves As An Indispensable Guide For Developers Seeking To Leverage React.Js To Build Robust And Scalable Web Applications, Offering Valuable Insights And Best Practices For Optimizing Frontend Development Workflows. Remarks: John Smith's Thorough Examination Of React.Js Equips You With The Knowledge Needed To Harness The Power Of This Popular Javascript Library, Ensuring Efficient And Scalable Development Of Your Platform's Frontend.

2.3THREE.JS: A COMPREHENSIVE SURVEY BY EMILY JOHNSON

Emily Johnson's Survey Provides A Thorough Examination Of Three.Js, Focusing On Its Capabilities In Creating Immersive 3D Graphics For Web Applications. It Discusses EssentialFeatures, Rendering Techniques, And Optimization Strategies, Offering Valuable Insights For Implementing 3D T-Shirt Customization On Your Platform. Emily Johnson's Survey Offers A Comprehensive Overview Of Three.Js And Its Capabilities In Facilitating The Creation Of Immersive 3D Graphics For Web Applications. By Delving Into Essential Features, Rendering Techniques, And Optimization Strategies, Johnson Equips ReadersWith The Knowledge Needed To Harness The Full Potential Of Three.Js In Their Projects. With Practical Insights And Examples, This Literature Survey Serves As A Valuable Resource For Developers And Designers Looking To Incorporate Interactive 3D Elements Into Their Web Applications, Enhancing User Engagement And Visual AppealEmily Johnson's Comprehensive Survey Of Three.Js Equips You With The Necessary Understanding To Leverage This Powerful 3D Rendering Library Effectively, Enabling The Creation Of Captivating And Interactive Experiences For Your Users.Organization And Preparation Of Functional Tests Is Focused On Requirements, Key Functions, Or Special Test Cases. In Addition, Systematic Coverage Pertaining To Identify Business Process Flows; Data Fields, Predefined Processes, And Successive Processes Must Be Considered For Testing. Before Functional Testing Is Complete, Additional Tests Are Identified And The Effective Value Of Current Tests Is Determined.

Prompt Input Image



Logo Change Image





CONCLUSION AND FUTURE ENHANCEMENT

Conclusion

In Conclusion, This Project Presents A Cutting-Edge Solution Aimed At Revolutionizing The Fashion Industry By Offering Users A Dynamic Canvas For Self-Expression Through 3D T-Shirt Customization Powered By AI Technology. Leveraging React, Three.js, And Framer Motion, The Platform Delivers An Immersive And Personalized Shopping Experience, Transcending Geographical Boundaries And Traditional Offline Constraints. By Integrating Openai's Dall-E For Enhanced Personalization And Interactivity, Coupled With Seamless Online Shopping Capabilities, This Platform Sets New Standards For Creativity, Innovation, And User Experience In The Fashion Retail Landscape.

FUTURE ENHANCEMENT

Future Enhancement Of Open AI Dalle's Reshaping Creativity With Framer Motion

1. Enhanced AI Capabilities

Continuously Improving And Expanding The AI Models Used For Customization To Offer More Sophisticated Design Options And Recommendations Based On User Preferences And Trends.

2. Augmented Reality Integration

Integrating Augmented Reality (AR) Technology To Allow Users To Virtually Try On Customized Clothing Items In Real-Time, Enhancing The Online Shopping Experience And Increasing Confidence In Purchasing Decisions.

3. Social Media Integration

Adding Features That Enable Users To Share Their Customized Designs On Social Media Platforms, Fostering User Engagement And Attracting New Customers Through User-Generated Content.

4. Advanced Analytics And Personalization

Implementing Advanced Analytics Tools To Gather Insights Into User Behavior And Preferences, Enabling Further Customization And Personalized Recommendations Tailored To Individual Users.

5. Expansion Of Product Range

Diversifying The Product Range Beyond T-Shirts To Include Other Clothing Items And Accessories, Providing Users With A Comprehensive Fashion Customization Experience.

6. Collaborations And Partnerships

Partnering With Fashion Brands, Designers, And Influencers To Offer Exclusive Collaborations And Collections, Expanding The Platform's Offerings And Attracting A Wider Audience.

7. Accessibility And Localization

Improving Accessibility Features And Localizing The Platform To Cater To A Global Audience, Ensuring Inclusivity And Usability Across Different Regions And Demographics.

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THE NECESSITY AND IMPORTANCE OF DEVELOPING SOCIAL AND INFORMATION COMPETENCE IN STUDENTS

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ABSTRACT

The most important characteristic of the modern world is the globalisation of information. In modern conditions, the large-scale information platform created with the help of digital technologies reflects a certain, one could say, the main part of the activity of each social subject. Interpersonal communications, based on the technical and functional capabilities of information technologies, at first glance seem very simple and safe. However, this process, which is the most effective in the manipulation of personality and requires relatively small economic costs, is extremely dangerous in nature. To prevent this risk, it is important to develop social and information competence in young people, especially students. This is the focus of this article.

KEY WORDS: *students, information, competence, socio-information competence, development of socio-information competence.*

Information is the basis of interpersonal relations. Nowadays, information not only serves as a source for communication between people, but is also becoming increasingly important as the main weapon of ideological struggle, a way of explaining social reality, as well as presenting to a wide mass of consumers different products and services, in particular, educational services. Therefore, we can say that information fulfils the function of the main lever that sets in motion the mechanism of information society and digital economy.

In the sources the concept of 'ahborot (information)' (Arabic 'خبار' - message, news, information, rumour, finally, information) is interpreted as follows: a detailed message or information about some event [2]; the content itself, i.e. the process of data transmission and the meaning of a message (signal) or information about something perceived at the moment of awareness [6, - p. 868]; facts, events, processes and phenomena used in decision-making in the process of management of certain objects, the state and characteristics of objects of a certain field [1]; facts, events, processes and phenomena used in decision-making in the process of management of certain objects, the state and characteristics of objects of a certain field [1]. 868]; facts, events, processes and phenomena used in decision-making in the process of management of certain objects, the state and characteristics of objects of a certain area [1]. In general, through information, a specific reality is communicated, the essence of any phenomenon, process, object is presented.

Information, an essential tool of the information society, is presented or transmitted in print or electronically in various forms (speech, text, image, video, audio, conventional signs, digital signals). In turn, information, as well as in its presentation and transmission, 'is perceived in various ways' [9, - c. 102]. In particular, in existing conditions, information is provided and received by means of acoustic means (e.g., sound amplifier), mail, telephone, telegraph, means of telecommunication - radio, satellite communication, television, signalling (means of signal transmission), Internet.

The origin of the mutual exchange of information in the process of social relations ensures that a personality receives information about a particular event, phenomenon, process, object, subject, object; satisfies needs arising on the basis of personal interests; forms relations; ensures constancy and consistency in relations; regulates the process or activity of people; enriches the knowledge acquired in a certain area or direction; develops the worldview and spirituality of a personality.

Moreover, information with negative content can lead to destabilisation of stable relations and processes. Accordingly, we can say that in the process of information exchange it acquires a social (socialisation), cognitive (knowledge acquisition), regulatory (management) and reflexive (evaluation) character. This helps to realise the social significance of information or its negative consequences.

In modern language usage, the term 'content' is used instead of the concepts of 'information' and 'collation'. We would also like to provide a definition of this concept. The concept of 'content' means 'content' in English and theoretically represents arguments and data presented in various topics and forms, theoretically intended for users. It has a broader definition ('any information having the nature of a message or meaningfully supplementing an information resource' [7, - p. 65]; content of information provided on web pages, in social networks, messenger channels and various programmes [5]; information content of a website (consisting of texts,



graphic and sound information, etc.), as well as books, etc.), as well as books, newspapers, collections of articles, materials and other sources [12]; end-user or audience-oriented information and experiences [11]) and, despite its application in all fields, refers to generalised information disseminated due to the development of the Internet [8, - p. 31]

Most people consider content to be all the information shared on social media - posts, stories (mini-reports that run for 24 hours and cannot be liked or commented on), videos, adverts and the like.

In our point of view, any information disseminated through any source, including print, electronic, visual and audio media, and the content expressed therein is considered content.

The results of the research show that in modern conditions the mass media are sufficient to conquer a country or a nation. At the same time, the use of force, coercion and violence are giving way to mind control technologies, which include information influence and persuasion of people in any idea. Today, with the help of information it is possible to capture the consciousness of young people, including students, without labour and unnecessary economic costs. Therefore, it is reasonable to assess its danger higher than the threat of armed conflicts. Since the information struggle is conducted covertly, it is impossible to identify its subject.

Moreover, preventing the propagation and eliminating information that contradicts national mental characteristics, national spiritual values, lifestyles, life aspirations and moral views is considered a complex process.

This complexity is manifested in the lack of society's ability to confront information threats in an organised manner. Undoubtedly, in the information society, along with the term 'content' the concept of 'electronic content' ('digital content') is used. We consider it expedient to familiarise ourselves with the essence of the term 'electronic content' ('digital content'). Electronic content (digital content) is a set of entertainment, information materials that are distributed electronically through special channels for operation on digital devices: computers, tablets, smartphones. The main types of modern digital content are text, games, video and audio materials[10].

There are different views and approaches to explaining the essence of the term 'content'. Some researchers are of the opinion that the concepts 'information/content' have a single content, while the researchers of the second group (for example, E.S. Guseva) [3, - p. 210] refute this point of view.

In the conditions of globalisation, the territory covered by information has expanded, the possibility of a person to receive and exchange information has increased proportionally. However, in the information environment a person faces not only useful, necessary and important information, but also harmful, unnecessary and irrelevant. This, firstly, distracts a person from the main issue and the studied problem; causes hesitation and doubts; leads to 'deviations' in views and approaches; and also contributes to the fact that inexperienced young people perceive harmful information as useful. Therefore, in the conditions of global informatisation, it is advisable to inform the individual about methods, ways and means of searching, analysing, processing, storing, using and transmitting information, as well as to apply them in practical activities.

In the conditions of global informatisation, young people search, analyse, sort, process information and use it in their personal activities directly through the Internet and with the help of gadgets [4], with social networks occupying the main place in this process. That is why it is extremely important that young people, in particular students, have socio-information competence.

In essence, socio-information competence is a person's ability to act effectively in the information environment, to master the skills, abilities and experience of using ICT in this process (motivational level), to be sufficiently aware of the functional capabilities of ICT (cognitive level), to be able to use them purposefully and creatively to realise the goals of personal development (activity-reflexive level).

It should be noted that the concept of 'socio-information competence' implies the following aspects: 1) ability to effectively use information and communication technologies (ICT); 2) organisation of activities with the help of ICT; 3) establishment of interaction and exchange of experience between subjects through ICT; 4) receipt of education by subjects in online mode with the use of ICT.

Students' possession of social and information competence is especially evident in interaction with teachers, peers and social subjects, in particular, when social interaction is carried out through ICT, especially through social networks. When organising communicative relations with the subjects, students should observe certain socio-moral norms and possess the qualities of virtual culture. A positive solution to the research problem implies achieving the necessary results in this context as well.

When developing students' socio-information competence in the system of spiritual and educational work of higher education institutions, it is necessary to take into account the following: clarification of the functions of information and communication competences, based on the requirements of information society and socio-educational needs; achievement of harmony of personal



and professional information space in the process of developing students' socio-information competence, effective use of the experience of leading foreign countries in the formation of information and communication competence of students in the system of spiritual and educational work of higher education institutions.

Pedagogical activities aimed at the development of students' social and information competence in the object of research should provide the following results: creation of necessary conditions for students to effectively master the competence of controlling and managing the sources of information flow affecting the social environment to which they belong, as well as their personal needs in obtaining information; development of measures to protect students from information attacks and threats of negative influence of Internet resources; creation of methodological and methodological support for the development of social and information competence of students in the object of research; creation of methodological and methodological support for the development of social and information competence of students in the object of research.

Collaborative interaction between higher education institutions and public organisations is considered an important factor in preventing such an onslaught called 'cultural "hegemony"'.

The organisation of pedagogical activity on the basis of collaborative interaction between higher education institutions and public organisations in the following directions allows to successfully develop students' socio-informational competence:

1) development of diagnostic tools to determine students' social and information competence; 2) organisation of educational work to assess the essence, safety and significance of information widely disseminated in the social environment to which students belong; 3) organisation of practical activities (trainings, debates, forums, festivals, actions) that contribute to the development of students' social and information competence; 4) providing students with information about the global information environment, its advantages and disadvantages; 4) providing students with information about the global information environment, its advantages and disadvantages.

Thus, in the conditions of global informatisation, a large-scale information platform is being created with the help of digital technologies. Information, which is a key element of this platform, by its nature has a significant power of influence. Content, as the main product of social media, not only conveys information and notifies users about its content, but also creates an opportunity to manipulate them. Therefore, in order for interpersonal communication carried out on social media to be useful and effective for young people, in particular students, it is necessary to develop their social and information competence.

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BEAT THE CLOCK: ANDROID APPLICATION TO MEASURE THE LEVEL OF LOGICAL THINKING AND DEVELOP THE SPEED OF MATH RULES OF ELEMENTARY STUDENTS

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ABSTRACT

Integrating digital technology into the educational process has significantly transformed traditional teaching and learning paradigms, offering more engaging and interactive methods. However, many young learners face challenges balancing academic responsibilities with extracurricular activities and often find conventional book-based learning unappealing. This paper proposes an innovative Android-based educational game, Beat the Clock, designed to enhance the teaching-learning process by merging education with entertainment. The game incorporates multiple levels targeting logical reasoning, mathematical proficiency, and general knowledge, supported by a robust performance measurement algorithm. Unlike existing educational games, Beat the Clock diversifies its scope to include languages, general knowledge, and other cognitive skills, thereby fostering holistic development. Additionally, the game provides performance summaries to assist parents in identifying their child's strengths and weaknesses, enabling personalized learning strategies. By gamifying education, Beat the Clock aims to make learning an enjoyable and effective experience, revolutionizing traditional methods.

KEYWORDS: *Logical Thinking, Gamified Learning, Android Game, Mathematics Education, Toddlers*

1. INTRODUCTION

Technology's quick development has revolutionized education currently and created chances to greatly improve the teaching and learning process. The goal of this project is to create an educational game application for Android that will evaluate kids' logical thinking skills and help them get better at arithmetic. The game will have several stages, each concentrating on a different subject, guaranteeing young students an interesting and participatory experience.

The primary objective of this study is to integrate entertainment with education, creating a platform that motivates children to learn through enjoyable and interactive methods. The application will cover diverse subjects, including mathematics, general knowledge, language skills, and logical reasoning. While numerous educational games exist with similar objectives, this research seeks to introduce innovative features, such as multi-themed levels and a comprehensive performance summary, to distinguish the game from its counterparts.

The proposed application will be convenient to use and let children study and play in the privacy of their own homes while being watched over by their parents. The research being conducted aims to promote children's greater engagement and excitement for learning by fusing entertainment with educational content, which will ultimately lead to better academic achievement.

1.1. Problem Statement

Many educational applications lack multidisciplinary approaches or fail to provide personalized performance insights. Furthermore, the absence of engaging, gamified tools targeting logical thinking and mathematics hinders their effectiveness.

1.2. Purpose

This research introduces *Beat the Clock* as a solution, blending interactive gameplay, error feedback, and performance analytics to bridge the gap between education and entertainment.

1.3. Objectives

- Develop game levels to enhance logical and psychological thinking.
- Design an Android-based game to improve children's mathematical knowledge.
- Create an algorithm to measure children's performance.
- Provide a learning environment that is gamified to help kids enjoy studying.



2. LITERATURE REVIEW

Mathematics instruction according to the new educational M-learning tool This article suggests and assesses a smartphone app to support teachers of elementary mathematics. The goal is to present a game that covers math course material by the Para Metros Curriculum Nacionais. This research has a drawback because it solely examines the material covered in math courses. As a result, parents won't receive precise outcomes from the game. Therefore, parents can only assess their children's mathematics skills.

[1]This study focuses on implementing the mathematics curriculum in primary education using traditional children's games. Learning objectives are tailored to K–9 students in rural and urban areas, considering their cognitive capacities. However, the research remains in its early stages and lacks developmental levels. The repetitive nature of the games, delivered via a projector, risks disengaging students due to monotony.

[2]Android educational games target elementary and high school students to enhance basic skills such as solving simple mathematical problems. Although accessible and user-friendly, the games primarily emphasize mathematical content without offering varying levels or dynamic elements. The lack of diversity, akin to repeated "snakes and ladders" levels, limits their effectiveness in sustaining engagement.

[3]This study introduces games designed to develop children's analytical and problem-solving skills by identifying deviations in patterns. While innovative in its approach, the game suffers from limitations such as insufficient levels and repetitive random figure displays, which fail to challenge the children consistently.

[4]Research on digital game-based learning for 3–4-year-olds highlights developmentally appropriate design focusing on cognitive, psychomotor, and socio-emotional growth. By integrating problem-solving activities, these games enhance mathematical skills, memory, and technological aptitude. The research emphasizes algorithmic design as a key factor in creating effective educational games.

[3]This study explores cloud-based multiplayer video games aimed at improving children's logical reasoning and cognitive skills. Using a variety of topics and stages, the games enhance academic achievement and include entertaining yet informative content. The design incorporates theories of cognitive development, computational intelligence, and tools like OOHDM and photon cloud, utilizing keywords such as artificial intelligence and cloud computing.

[5]This research investigates imaginative play and logical reasoning in toddlers, observing 4-year-olds to measure creativity and problem-solving skills. The framework incorporates symbolic use, encouraging inventiveness while involving parents through consent processes. Although insightful, the study lacks a clear pathway for further applications.

[6]This game aims to develop logical thinking in children by using block-shaped stained-glass pieces to assess color discrimination. However, repetitive levels without progression risk disengaging users. A more dynamic approach with varied challenges would enhance its educational impact.

[5] A tablet-based game designed for autistic children integrates three stages: two-dimensional gestalt designs (Rails), logistic complexity (Pipes), and three-dimensional visuals (Snakes). The methodology involves prototype creation, usability testing, and user evaluations. This structured approach provides valuable insights into designing games tailored to specific needs.

[7]Carmona and Millan's research integrates formative evaluation to enhance the effectiveness of a Spanish orthography game. The system currently tracks students' scores but could benefit from advanced user modelling to adapt difficulty levels dynamically, motivating learners to improve spelling and comprehension.

[4]This game focuses on enhancing logical thinking through progressively challenging levels. Players connect three or more magnets of the same color to succeed. The inclusion of varied levels improves engagement and performance among young learners.

[8]Research into the integration of ICT in preschool education highlights its formal and informal applications. While tools like tablets are portable and cost-effective, toddlers often struggle with devices requiring mouse operations. Effective games need to balance usability with cognitive challenges tailored to this age group.

[9]Mind games analyzed in this study aim to enhance children's cognitive processes. However, the lack of interactivity and fun limits their effectiveness. Incorporating engaging features, such as those found in "Beat of the Clock," would significantly improve the learning experience.

[10]A mobile application designed for reading, spelling, and math skills in infants and preschoolers demonstrates high functionality but faces challenges due to its cost. The research emphasizes evaluating system efficacy to justify the investment compared to traditional methods.

3. METHODOLOGY

The proposed application was developed using the prototype technique, an iterative process comprising planning, analysis, design, implementation, and testing stages. This methodology emphasizes continuous refinement, where each cycle incorporates user feedback and introduces new features. By focusing on iterative development, the prototype evolves into a fully functional system that meets user requirements effectively.

3.1 Planning

The project followed the Software Development Life Cycle (SDLC) framework, with a six-month timeline for systematic execution. Key tasks were defined, assigned deadlines, and monitored rigorously. The project's concept—a mobile application to enhance



logical reasoning skills in children aged 8 to 12—was refined through a comprehensive review of related studies and applications. This informed the creation of a Gantt chart, establishing timelines for all functions and ensuring methodical progression.

3.1.1 Identifying Business Values

Parents and educators, key stakeholders, shaped the application's values: fostering a love for learning, enhancing math skills, and providing an engaging, user-friendly experience that blends entertainment and education to empower students.

3.2 Analysis and Requirement Gathering

3.2.1 Analysis

To define the requirements for *Beat the Clock*, data collection involved parents, educators, literature reviews, observations, and interviews. This systematic approach ensured the application aligned with user needs and educational goals effectively.

3.2.2 Requirement Gathering

Observation was the primary data collection method to address the limitations of traditional surveys with young students. A study at Reggie Ranatunga College, Minuwangoda, involved Grades 3, 4, and 5 students performing lattice method exercises in addition, subtraction, multiplication, and division under teacher supervision. Completion times were recorded and analyzed: addition (2.33 minutes), subtraction (2.58 minutes), multiplication (2.97 minutes), and division (1.41 minutes). These insights emphasized time-based activities to foster logical and analytical thinking. By incorporating these findings, *Beat the Clock* delivers an engaging educational tool tailored to improve student skills while aligning with curriculum goals effectively.

3.3 Designing

The design phase focused on client-side programming and system architecture, crucial for prototype development. The architecture consisted of two main components: the mobile interface and the game database. Players access games by downloading the app, with a one-way data flow from the database to the device, ensuring simplicity and user-centric functionality.

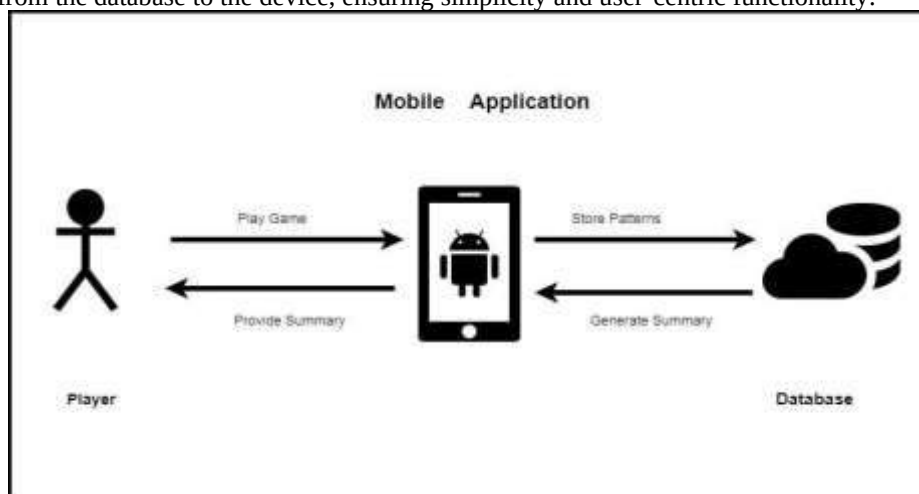


Figure 1: System Architecture Diagram

3.4 Implementation

The "Beat the Clock" Android application was developed using Android Studio, SQLite, Balsamiq Wireframes, and Microsoft Project. Its framework consists of a Title Screen, Operation Selection Screen, and Gameplay Screen, offering an intuitive user experience. SQLite managed data storage, while Android Studio provided a reliable development environment. A deployment diagram outlined hardware and software requirements, including Android SDK and Gradle. Promotional videos were created with a video editor, and documentation was prepared using Microsoft Word and PowerPoint. The development process ensured the application met its goal of enhancing students' analytical and mathematical skills.

3.5 Testing

Unit testing validated individual code components, addressing challenges like threading complexities. Integration testing ensured seamless component interaction, including login and gameplay. Non-functional testing assessed performance, responsiveness, and usability, while system testing confirmed compliance with all requirements. Ultimately, "Beat the Clock" emerged as a reliable, engaging, and user-friendly educational app for elementary students.



4. RESULTS AND DISCUSSION

“Beat of the Clock” Mobile Game Application

The user-centric interface of the "Beat the Clock" mobile game application is intended to improve the educational experience for young learners. The Addition, Subtraction, Multiplication, Division, and Score Screens are among the important screens, as are the Login, Select Grades, Play Option Selection, and Operation Selection displays. These elements collectively provide a seamless navigation structure, engaging gameplay, and effective progress tracking. Users begin by authenticating through the Login Screen, tailored to ensure security. They then proceed to select their grade level, choose play options, and engage in operations aligned with their skills. Each operation culminates in a Score Screen, offering detailed performance insights.

- **Login Screen**

By asking users to enter their username and password, the Login Screen guarantees safe access to the program. While returning players can see a gaming demonstration film, new users can register using the Register Screen. This screen emphasizes user authentication and application security.

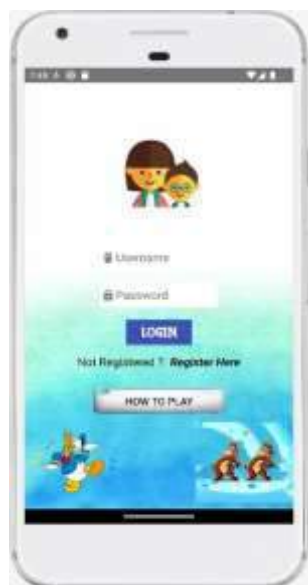


Figure 2: Login Screen

- **Select Grades**

After logging in, users access the Select Grades screen, where they choose their grade level (Grades 3–5). This customization tailors content difficulty, ensuring an age-appropriate experience aligned with curriculum needs.



Figure 3: Select Grades

- **Play Option Selection Screen**

Users can choose between typing and selecting options on the Play Option Selection Screen. This flexibility accommodates varying skill levels and enhances user engagement.



Figure 4: Play Option Selection Screen

- **Operation Select Screen**

The Operation Select Screen offers four mathematical operations—Addition, Subtraction, Multiplication, and Division. Users select one to proceed, fostering targeted learning and skill improvement.



Figure 5: Operation Select Screen

- **Playing Screens**

After completing an operation, users receive a score summary screen showcasing their performance. This feedback promotes progress tracking and motivation for skill enhancement.



- **Selection Option**



Figure 6: Selection Option

- **Typing Option**



Figure 7: Typing Option

5. CONCLUSION

This research highlights the potential of "Beat the Clock," an Android application, to transform primary mathematics education. Iterative development, informed by user feedback and rigorous testing, ensured reliability. Observations and interviews affirmed its effectiveness in enhancing engagement, mastering math concepts, and fostering logical thinking among students.

5.1 Limitation

The research faced limitations, including a small sample size restricted to government primary schools, time constraints, limited prior research, and challenges linking game content to real-life applications, emphasizing teacher involvement for better integration.

5.2 Future Work

Future research should expand the sample size, involve educators and developers, adapt the app for higher grades, incorporate advanced features, and use feedback to ensure sustained engagement and educational relevance.

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THE ESSENCE AND CONTENT OF APPLYING LOGISTICS IN MANAGEMENT ACCOUNTING

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ABSTRACT

This article examines issues such as the application of logistics in management accounting within enterprises. In particular, it highlights the features of organizing logistics costs in management accounting and their role in managerial activities, develops scientific proposals for effective management of costs from a logistics perspective, improves prompt internal accounting in management, and explores the practice of organizing logistics costs in management accounting for supply, production, and sales processes.

KEYWORDS: management accounting, logistics, costs, flows, supply, production, sales.

INTRODUCTION

In today's competitive environment, characterized by globalization of the economy and the need for fundamental reforms in enterprise management systems, the effective organization and improvement of management accounting has become crucial. Therefore, efficiently organizing costs and implementing logistic management in the supply, production, and sales chains of enterprises has emerged as one of the most pressing issues.

Naturally, the requirement to maintain timely and reliable management accounting information as part of the broader accounting framework emphasizes the need for in-depth research on cost-related processes in management accounting. Achieving positive results in management is the current primary goal.

Indeed, developing and implementing effective projects is particularly relevant under today's conditions. This necessitates the creation of a fully comprehensive database and reforming accounting systems to meet modern requirements. The integrated management of material and related flows through the logistics chain—comprising "procurement - production - distribution - sales - service"—is required to align enterprise managers' actions via integrated logistics tools. Accordingly, reducing costs and managing labor, material, financial, and information flows is considered integral to logistics.

As challenges arise in the management accounting of enterprises, shortcomings in its organization have become evident. The development of infrastructure, modernization of enterprises, and the proper integration of logistics and management in production remain critical issues. Based on these factors, the necessity of organizing logistics costs in the management accounting of manufacturing enterprises underscores the relevance of this problem.

RESEARCH METHODS AND MATERIALS

Numerous scientific studies by both domestic and foreign economists address the issues of organizing logistics costs within management accounting.

Foreign scholars such as J. Stonehouse, B. Houston, D. Caldwell, B. Needles, J. Foster, C. Horngren, K. Drury, and G. Stabenaue, as well as researchers from the CIS, including A.F. Aksenov, R.V. Borisov, M.S. Bobizhanov, M.A. Vakhrushina, T.P. Karpova, N.P. Kondrakov, V.F. Paliy, Y.V. Sokolov, V.I. Strazhev, I.E. Tishkov, D.U. Urokov, A.D. Sheremet, and N.G. Chumachenko, have conducted significant studies. Additionally, Uzbek scholars like A.A. Abduganiev, R.D. Dusmuratov, O.M. Jumonov, D.U. Mamadiyarov, A.A. Karimov, A.Kh. Pardayev, B.Kh. Pardayev, M.M. Tolahodjaeva, B.A. Khasanov, and A.A. Khashimov have analyzed management aspects and theoretical issues of management accounting in their research. Furthermore, Kazakh scholar K.T. Taygashina has specifically examined the methodological aspects of applying logistics in management accounting.

RESEARCH RESULTS AND DISCUSSION

According to K.T. Taygashina, "logistics," when translated from English, means "supply" [1], while K.A. Dadabayev describes "logistics" as derived from the Greek word meaning "calculation" [2]. Our research indicates that the definition of "logistics" has varied across different periods, and a universally accepted definition has not yet been established. Presently, numerous perspectives and interpretations of "logistics" can be found in scientific and economic literature. Western specialists view logistics as one of the



most powerful tools for strategic planning of firms and companies and for competing effectively with rivals. Introducing logistic management leads to savings in financial, material, raw, and other resources.

Several economists, including L.F. Bobinin, K.A. Dadabayev, V.G. Degtyarenko, O. Dilmurodov, E.A. Golikov, M.P. Gordon, L.S. Fedorov, and G. Stabenaue, have provided definitions of logistics in their monographs, textbooks, manuals, and other scientific works. However, they have not specifically addressed its role and importance in management accounting. These researchers recognize logistics as a system for managing material flows but only highlight its relevance to supply processes. Summarizing the definitions provided by economists, logistics can be considered as the management of flows that cause dynamic changes over a given period.

Based on an in-depth analysis of the definitions and findings from our research, we propose the following definition: "*Logistics is one of the tools for reducing costs in supply, production, and sales processes. It involves managing material, financial, and information flows, as well as labor resources, in the most optimal ways to ensure the competitiveness of an enterprise's products, services, and operations.*"

This definition comprehensively reflects the essence of logistics, with additional insights to consider: First, utilizing logistics operations in supply, production, and sales processes within management accounting is essential to minimize costs. Management accounting serves as the primary source of information for developing management decisions regarding logistics flows, including material, financial, and informational streams.

Second, the use of logistics in management accounting is a critical factor for overcoming competition in the production and sale of products and the provision of services.

Third, achieving high profitability hinges on the efficient management of material, financial, and informational flows - essentially, logistic flows.

Efficient management of logistic flows is crucial for improving an enterprise's management accounting, leading to the development of measures that assist in decision-making.

According to Uzbek economists A.Kh. Pardayev and B.Kh. Pardayev, "The decision-making process in management often resembles an art, requiring high qualifications, practical experience, and developed intuition" [3].

B.A. Khasanov and A.A. Khashimov emphasize that "The process of making management decisions holds a special place in the economic activity of enterprises, requiring high qualifications and practical experience. Management decision-making begins with defining the enterprise's goals and objectives" [4].

A.A. Karimov notes, "The importance of information in management lies in its role as the foundation for making management decisions" [5].

Russian researchers N.V. Kozlyuk and S.N. Ugrimova state, "At every stage of planning and operational control, the foundation for management decision-making is accounting information" [6].

Similarly, Yu.A. Mishin highlights that "Ensuring the high economic efficiency of management decisions is no easy task, but the aspiration to maximize efficiency remains constant among managers" [7].

Endorsing the above perspectives, it is evident that the continuous management of logistic flows is indispensable, and the significance of management decisions cannot be overstated. Thus, the enterprise's management apparatus must base every operation on precise analytical results to achieve organizational objectives.

In our view, the following steps are essential for improving the decision-making process in management accounting:

1. Development and Preparation of Management Decisions: Assessing the situations in supply, production, and sales processes; Developing various options for management decisions; Selecting the optimal options for measures and plans; Analyzing the reasons for decision-making.

2. Evaluation: Assessing the economic efficiency of decisions; Ensuring timely implementation; Evaluating the social impact; Identifying and managing risks.

3. Making Management Decisions: Drafting and formalizing orders and directives; Assigning responsibilities to accountable individuals; Establishing deadlines for implementation; Communicating decisions effectively to implementers.



4. Execution of Tasks: Preparing programs and providing them to executors; Delegating and dividing tasks and responsibilities; Explaining and clarifying assignments; Motivating and encouraging employees for task completion.

Control of Execution: Monitoring and addressing errors and deviations; Ensuring adherence to deadlines; Identifying and evaluating results; Exploring alternative options and implementing them as needed; Identifying those responsible for deviations; Addressing any discrepancies in the execution of decisions.

From the logistics perspective in management accounting, thorough development and revision of logistics processes in enterprise management can significantly reduce costs. Consequently, logistics management involves not only optimizing individual stages like supply, production, or sales but managing the entire process comprehensively to achieve the best outcomes. Unlike traditional management, where attention might be unevenly distributed across supply, production, and sales stages, logistics management ensures that no part of the chain experiences a decline in performance. This holistic approach prevents inefficiencies and ensures seamless integration of all operational stages.

For significant cost reduction in management accounting, it is advisable to apply logistics processes and grant additional responsibilities to specialists in accounting, internal audit, and management services. These responsibilities should include the following:

- Sharing information on logistics strategies adopted within production and management accounting;
- Developing and implementing measures for reorganizing the management of material and financial flows;
- Ensuring timely acquisition, storage, transfer, and processing of necessary information;
- Controlling and managing human resources effectively;
- Collaborating with other legal and physical entities to develop and implement strategic decisions.;
- Tracking financial indicators to assess the effectiveness of logistical decisions in management accounting.

In management accounting, logistics primarily involves the integration of material, financial, and informational flows, considered as a unified system of physical entities. Consequently, when establishing a logistics system, it is essential to ensure that the system is adaptable to these flows. This is because material, financial, and informational flows traverse various forms, states, and conditions throughout the supply chain, from suppliers to consumers, facilitated by logistical processes.

When implementing logistics operations in management accounting, it is important to distinguish and integrate activities aimed at modifying material, financial, and informational flows into a cohesive system. Operations related to organizing logistics costs and ensuring the production process are regarded as internal operations, while processes focused on fulfilling supply and sales functions are external operations.

In management accounting, the management of material flow necessitates specific logistics operations such as: collection, storage, processing, and the delivery of information and financial outcomes.

This is because material flow is considered in conjunction with an informational flow, which means it must be managed and optimized to ensure seamless coordination and control throughout the supply chain. Proper management of material flows helps to reduce costs, improve efficiency, and support informed decision-making by integrating relevant data and financial results into the process. The effective management of labor resources is crucial for establishing the mechanism to manage material, financial, and informational flows from procurement to the sale of products to consumers. Companies that view skilled personnel as their most valuable labor resource are more likely to successfully implement an efficient logistics system in management accounting. Therefore, it is essential that company leaders today prioritize the selection, professional training, and preparation of their workforce.

In our opinion, for the high-level management of the logistics sector in the Republic of Uzbekistan, the staffing system must be closely linked with the training of highly qualified and experienced accountants, internal auditors, and managers to ensure the successful execution of a company's strategy and plans. Only then can a company achieve high results in aligning material, informational, and financial flows in a purposeful and planned manner.

Monitoring daily economic operations within a company is the responsibility of the accounting department staff and internal auditors. They need to gather, process, and provide quick access to daily data for management, ensuring information about all logistics flows is collected and processed efficiently. This is necessary because data is not always collected accurately, completely, reliably, and promptly. We believe that applying logistics operations in management accounting is the most effective way to achieve high efficiency.



In management accounting, the tasks of the logistics system involve developing management decisions aimed at achieving optimal pricing through effective cost management, and logistics management includes costs related to supply, production, and sales processes. For these reasons, the general tasks of logistics in management accounting are deemed appropriate for implementation in our country's economy. Setting the tasks of logistics in management accounting, in our opinion, is established through the following theoretical-methodological principles:

- Developing principles in management accounting for logistics tasks aimed at overcoming crises;
- High-Level computerization and automation of the logistics sector in management;
- Designing separate elements of logistics tasks in management accounting that do not fall victim to negative market impacts;
- Ensuring modern adaptability of logistics tasks in management accounting with reliability and high quality;
- Developing and adopting effective management decisions to minimize logistics costs through their organization in management accounting.

Analysis of the studied economic literature and sources indicates that the use of logistics in management accounting is widely practiced in developed market economies.

In this regard, we emphasize the importance of establishing a logistics chain that aligns with the market within the relationships between suppliers, producers (service providers), and consumers, and organizing it based on optimal logistics management principles that help them capture the market.

Our research has shown that, in our opinion, the goal of logistics in this area is to achieve high profit by optimizing costs in the processes of delivering, unloading, storing, using, and selling finished products to consumers through optimal selection of suppliers and management of inventory.

The study and analysis of logistics costs in the use of logistics systems in management accounting play a significant role in improving our economy. It should also be emphasized that warehouse management costs, inventory creation, storage of reserves, transportation and handling costs, production planning, fulfillment of consumer orders, and other costs are interrelated.

Even reducing certain types of costs can lead to an increase in other costs, so it is important to thoroughly analyze the consequences of implementing and changing each type of cost before managing logistics costs effectively in management accounting. However, drastic changes or reorganization of the system can also result in an increase in logistics costs. We believe this could be due to the following factors:

1. Insufficient information and financial flows in management accounting;
 2. Implementing management decisions without analysis;
 3. Management staff not completing tasks on time or with responsibility;
 4. Implementing changes without analyzing important aspects, developing management decisions without considering market demands and changes;
 5. In practice, the goals of logistics may not align with the objectives of management accounting, marketing, or production.
- In our opinion, logistics costs are the expenses incurred to activate logistics flows (material, financial, information flows, and labor resources).

CONCLUSION

In our opinion, it is complex to manage production without organizing warehouse management and inventory in enterprises of the Republic of Uzbekistan. For this reason, it is appropriate to apply the logistics system in management accounting to calculate the most optimal purchase standards and select reliable and guaranteed suppliers. In our view, based on the tasks of logistics in management accounting and the current demands, it is necessary to develop specific directions for improving logistics costs in management accounting for effective management of supply, production, sales, delivery, and warehouse management costs in enterprises of the Republic of Uzbekistan. Additionally, a comprehensive method for effective management of logistics costs in management accounting should be extensively researched.

In managing logistics costs in management accounting, it is appropriate to organize activities considering all factors affecting the changes in market infrastructure, the scarcity of financial flows in payment processes, high levels of competition, and the increase in enterprise costs. To date, the effective management of logistics costs in management accounting has not been studied through serious scientific research in our country. Ignoring the effective management of logistics costs in management accounting and not considering these processes as a subject of research leads to negative consequences.

We recommend implementing the following measures for the effective management of logistics costs in enterprise management accounting:

1. Developing management decisions taking logistics costs into account in management accounting;
2. Organizing management accounting using logistic methods;



3. Maintaining accounting for each logistics flow in management accounting;
4. Organizing the joint application of management accounting and logistics in the development of enterprise activities;
5. Strengthening the interconnection between current and operational planning in organizing logistics costs;
6. Implementing effective management of logistics costs to achieve optimal pricing.

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QUESTIONS OF CREATING THE IMAGE OF A FATHER IN UZBEK AND RUSSIAN FICTION

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ANNOTATION

The art of creating a father's image is widespread in world fiction. Of particular importance is the comparison of the image with the fiction of other nations. That is why we decided to study the skill of creating a father's image in Uzbek and Russian literature.

KEYWORDS: *Father's Image, Relationship, Realistic and Mythical Image, Compositional Skill of Writers, Comparative Aspects.*

ВОПРОСЫ СОЗДАНИЯ ОБРАЗА ОТЦА В УЗБЕКСКОЙ И РУССКОЙ ХУДОЖЕСТВЕННОЙ ЛИТЕРАТУРЕ

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Аннотация

Искусство создания образа отца широко распространено в мировой художественной литературе. Особенно большое значение имеет сравнение образа с художественной прозой других народов. Именно поэтому мы решили изучить мастерство создания образа отца в узбекской и русской литературе.

Ключевые слова: *образ отца, взаимоотношение, реалистический и мифический образ, композиционное мастерство писателей, сравнительные аспекты.*

In world literature, attention has always been paid to the relationship between man and nature, the realistic and mythical way of thinking of the individual, the ability of writers to use themselves artistically. Therefore, the study of the use of image, composition and mythopoetics by writers has become one of the pressing problems of literary criticism. When comparing prose works that are close to each other, but in completely different languages, the development of artistic thinking through each work, the study of the problems of artistic perception of being by writers in a comparative aspect acquires scientific and practical significance.

In world literary criticism, attention is always paid to the study of the identification features of Russian and Uzbek writers in the process of artistic comprehension, comprehension and expression of the world through issues of literary communication and creative influence of the two peoples. Evaluation of the figurative expression of reality, compositional skill of writers, use of artistic language is one of the pressing problems of literary criticism. After all, Russian literature, which has been in close cultural and literary ties for many years, and its influence on Uzbek literature have had a significant impact and have not lost their significance to this day. Not everyone is given to know Uzbek society from the inside and artistically express the national character and unique way of life of the people living here. In this sense, such issues as Russian and Uzbek artistic thinking, the process of artistic perception of



existence in them, artistic reflection of universal and national problems using the example of the prose of Timur Polatov and Khurshid Dostmuhammed allow us to check the evolution in the cultural sphere. development of the people. Man, who is the main subject of fiction, and his relationships with other people, society and the whole world show the essence of human development.

In recent years, interest in the works of world-famous writers and their artistic interpretation has been growing in our country. Among such works, one can name works in the genres of short stories, novels, created in Russian and depicting people, nature and culture of our country. After all, comparing the works of Russian and Uzbek writers among the "regional and universal factors of building a new Uzbekistan", analyzing the work of writers who create mature works about the cultural life of our country and convey artistic information about our country to other peoples of the world by studying the image of Uzbekistan in prose works in Russian, there are such tasks as studying their influence on Uzbek writers. First of all, it is necessary to pay special attention to the influence of the works of writers created on the basis of universal principles on people of modern society, their worldview and formation as an individual, as advanced achievements of world literature. This explains the need to study the influence of the prose of Uzbek writers on Uzbek literature.

Level of study of the problem. The prose of any two nations, the artistic image in them, its nature, figurative expression, understanding of the world by heroes from the mythopoetic aspect, similar and different sides of their artistic thinking have always been studied in the aspect of comparative literature. Works devoted to the scientific study of the image of the father occupy an important place in world and Uzbek literary criticism. In this regard, Holt Travis V. Peters, Audrey D. Fankhauser, Rochelle A. Jones, Fionn Wynn, Mann, Erin Irene from Western scientists. Tilson, H. Magnani, Roberta. Diaz, Claire; Among Russian scientists, the studies of M.I. Plyutov, T.A. Paramonova, I.V. Yeltsova, Yu.A. Surikov, S.V. Of particular importance in Uzbek literary criticism are the studies of such scholars as G. Mukhammedjonova, A. Ulugov, O. M. Matkurbanova, Z. N. Suvanov, M. N. Kholbekov, U. D. Karshibaeva, U. Yu. Rasulova, and H. R. Khaidarova. In the above studies, the role of the father's image in the development of literary and aesthetic thinking was studied using the example of different literary periods, national literature, or works by individual artists. However, no special studies have been conducted on the comparative study of the father's image in the works of Alexander Grinn and Ulugbek Khamdam in world and Uzbek prose.

The purpose of our future work is to study, on a comparative typological basis, the image of the father, reflected in the works of Alexander Grinn and Ulugbek Hamdam.

The objectives of our research work:

- Interpretation of the theme of the father in literary criticism, in particular, systematization of scientific and theoretical views on the image of the father, clarification of the harmony of the epic scope of the father's character, study of the primacy of the national spirit based on the image of the father in Uzbek and Russian fiction;

Clarification of artistic psychologism in the interpretation of the image of the father in Uzbek and Russian literature, study of the image of the father figure in the work of Alexander Green "Alvon Elkanlar" ("Blue Sails"), clarification of artistic psychologism in the novel by Ulugbek Hamdam "Father";

- Comparative analysis of the creative style and skills of Alexander Green and Ulugbek Hamdam;
- Comparative analysis of speech types and issues of language culture in the novels "Alvon Elkanlar" ("Blue Sails") and "Father" and analysis of the ideological and philosophical features of the image of the father.

As the object of our research we took "Alvan Yekanlar"

("Blue Sails") by Alexander Grin and "Ota" ("Father") by Ulugbek Hamdam. Partially touched upon and other works of these authors, in which the figure of the father is the leading figure.

The subject of our dissertation research is the genesis of the image of the father in fiction, the typology of the image of Alexander Grin "Alvon Elkanlar" and "Father" by Ulugbek Hamdam, as well as the artistic perception of the psychological image in prose.

Methods of research of our work. In the dissertation we will use comparative-typological, biographical, sociological, psychological methods of analysis.

Stages of the Dissertation Work

At the first stage. Study of literature on the topic, concepts of character and nationality, harmony of the epic scale of the father's character, the priority of the national spirit based on the image of the father in fiction. At the second stage, the leading figurative method of artistic psychology in the interpretation of the image of the father in Uzbek and Russian literature, the image of the father in the work of Alexander Green "Alvon Elkanlar", ("Blue Sails") artistic psychology in the work of Ulugbek Hamdam. novel "Father" is studied.



At the third stage, the methodology and analysis of the writer's style and skill are carried out, the style and skill of the writer in the works of Alexander Grin and Ulugbek Hamdam are studied at a comparative level. In the novels "Alvon Elkanlar" ("Blue Sails") and "Ota" ("Father"), the types of speech and language culture are analyzed.

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BLOCKCHAIN IN AGRICULTURE: REVOLUTIONIZING FOOD SUPPLY CHAINS AND SUSTAINABLE PRACTICES

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ABSTRACT

Blockchain technology is redefining agriculture by enhancing transparency, efficiency, and sustainability across food supply chains. Its decentralized and immutable nature ensures traceability, improves food safety, and reduces inefficiencies, enabling stakeholders to monitor every step from farm to fork. Smart contracts streamline transactions, reduce intermediaries, and promote fair trade, empowering small-scale farmers and fostering financial inclusion. Additionally, blockchain supports sustainability by enabling precise tracking of carbon footprints, water usage, and soil health metrics. Despite its transformative potential, challenges such as technological adoption barriers, high costs, and regulatory complexities persist. This paper examines the applications, benefits, and future implications of blockchain in agriculture, emphasizing its role in achieving sustainable and resilient agricultural systems.

KEYWORDS: Blockchain, agriculture, food supply chain, traceability, sustainability, smart contracts, food safety, financial inclusion, carbon footprint.

1. INTRODUCTION

- **Background:** Overview of current challenges in agriculture, such as food fraud, inefficiencies in supply chains, and unsustainable practices.

Agriculture, the backbone of global food production, faces a multitude of challenges that threaten its efficiency, sustainability, and ability to meet the growing demand for food. Among these challenges, food fraud, inefficiencies in supply chains, and unsustainable practices stand out as critical areas of concern.

1. Food Fraud and Safety Concerns

Food fraud, which includes mislabeling, adulteration, and counterfeiting, undermines consumer trust and compromises food safety. This issue affects both developed and developing countries, leading to economic losses and health risks.

- Examples: Counterfeit organic produce, diluted dairy products, and false origin claims.
- Impact: Consumers face health hazards, and farmers and businesses suffer reputational damage.

2. Inefficiencies in Supply Chains

Agricultural supply chains are often long, complex, and opaque, involving multiple intermediaries between producers and consumers.

- Key Issues:
 - Lack of real-time data sharing.
 - Mismatched supply and demand leading to overproduction or shortages.
 - Delays in payment to farmers, especially in developing regions.
- Consequences: Increased food waste, higher costs for consumers and reduced profitability for farmers.

3. Unsustainable Agricultural Practices

Modern agriculture has increasingly strained natural resources, contributing to environmental degradation.

- Problems:
 - Overuse of fertilizers and pesticides leading to soil and water contamination.
 - Deforestation and habitat loss for agricultural expansion.
 - High greenhouse gas emissions from farming activities.
- Long-term Risks: These practices threaten biodiversity, soil health, and the overall sustainability of food production systems.

4. Climate Change and Food Security

Agriculture is both a contributor to and a victim of climate change. Erratic weather patterns, prolonged droughts, and extreme events disrupt production and threaten global food security.

- Implications:
 - Reduced crop yields and quality.



- Increased vulnerability of smallholder farmers.

5. Inequitable Access to Technology and Markets

Small-scale farmers, who form the majority of producers in many regions, often lack access to advanced technologies and fair markets.

- Challenges:
 - Limited access to digital tools for better farming practices.
 - Exploitation by middlemen due to a lack of direct market access.
- **Blockchain Technology:** Introduction to blockchain as a decentralized, secure, and transparent technology.

Blockchain Technology: An Introduction

Blockchain is a transformative digital technology that provides a secure, decentralized, and transparent way of recording and sharing data. Initially developed as the backbone for cryptocurrencies like Bitcoin, blockchain has since evolved to have applications across various sectors, including agriculture. Its unique attributes make it a powerful tool for addressing challenges in supply chain management, data integrity, and sustainability.

1. What is Blockchain?

At its core, blockchain is a distributed ledger technology (DLT) that records transactions across multiple computers in a way that ensures data immutability and transparency.

- **Decentralized Structure:** Unlike traditional systems that rely on a central authority, blockchain operates on a peer-to-peer network. Every participant (node) has access to the same data, ensuring equality and reducing reliance on intermediaries.
- **Blocks and Chains:** Transactions are grouped into blocks, which are then linked in chronological order, forming a chain. Each block contains a unique cryptographic hash of the previous block, making it tamper-resistant.

2. Key Characteristics of Blockchain

- **Transparency:** All participants can access the same data, fostering trust and accountability.
- **Security:** Transactions are encrypted, and the decentralized nature minimizes the risk of hacking or fraud.
- **Immutability:** Once data is recorded, it cannot be altered without consensus from the network, ensuring the integrity of the ledger.
- **Traceability:** Blockchain provides a clear and auditable trail of transactions, critical for industries like agriculture where provenance and authenticity are crucial.
- **Smart Contracts:** Automated, self-executing contracts based on predefined conditions can streamline operations and reduce manual errors.

3. How Blockchain Works

1. **Transaction Creation:** A user initiates a transaction.
2. **Verification:** The transaction is verified by nodes in the network through consensus mechanisms like Proof of Work (PoW) or Proof of Stake (PoS).
3. **Block Formation:** Verified transactions are grouped into a block.
4. **Block Validation:** The block is validated and added to the chain.
5. **Ledger Update:** All participants' ledgers are updated simultaneously.

4. Relevance of Blockchain in Agriculture

Blockchain's ability to ensure transparency, security, and traceability makes it particularly relevant for agriculture:

- **Supply Chains:** It provides end-to-end visibility, ensuring the authenticity of food products.
- **Data Sharing:** Farmers, distributors, and retailers can collaborate securely without needing intermediaries.
- **Sustainability:** It helps monitor and verify sustainable farming practices, enabling ethical consumption.
- **Purpose of the Study:** To examine how blockchain transforms agriculture and contributes to sustainable development goals. The purpose of this study is to explore the transformative potential of blockchain technology in the agricultural sector, with a particular focus on its role in enhancing efficiency, transparency, and sustainability within food supply chains. By addressing key challenges such as food fraud, supply chain inefficiencies, and unsustainable practices, blockchain technology has the potential to revolutionize agriculture and contribute to achieving global sustainable development goals (SDGs).



Key Objectives

1. **Examine the Role of Blockchain in Modernizing Agricultural Supply Chains**
 - o Assess how blockchain enhances traceability and transparency, ensuring food safety and authenticity.
 - o Investigate its ability to streamline operations, reduce intermediaries, and improve market access for farmers.
2. **Evaluate the Contribution to Sustainability**
 - o Analyze how blockchain supports environmentally friendly practices, such as certifying organic and sustainable products.
 - o Highlight its role in minimizing food waste through better resource management and efficient logistics.
3. **Identify Benefits for Small-Scale Farmers and Rural Economies**
 - o Explore how blockchain empowers smallholder farmers by enabling direct transactions and fair pricing through smart contracts.
 - o Assess its potential to reduce inequalities by fostering financial inclusion and democratizing access to markets.
4. **Investigate Case Studies and Real-World Applications**
 - o Review successful implementations of blockchain in agriculture, such as IBM Food Trust and AgriDigital, to identify best practices and measurable outcomes.
5. **Address Barriers to Adoption**
 - o Understand challenges such as technological infrastructure, cost implications, and scalability to propose actionable solutions for widespread adoption.

Alignment with Sustainable Development Goals (SDGs)

The study emphasizes block chain's contribution to SDGs, particularly:

- SDG 2: Zero Hunger: Enhancing food security through improved supply chain management.
- SDG 12: Responsible Consumption and Production: Promoting sustainable agricultural practices and reducing waste.
- SDG 8: Decent Work and Economic Growth: Supporting fair trade and empowering farmers.
- SDG 13: Climate Action: Encouraging sustainable farming practices to reduce environmental impact.

2. BLOCKCHAIN APPLICATIONS IN AGRICULTURE

2.1 Supply Chain Transparency

Blockchain technology has the potential to revolutionize supply chain management in agriculture by introducing unprecedented levels of transparency. This section explores how blockchain enhances the traceability of food products and facilitates real-time tracking of crops and livestock, addressing critical issues of trust, safety, and efficiency in agricultural supply chains.

Traceability of Food Products from Farm to Fork

Traceability refers to the ability to track the origin, movement, and processing of food products through every stage of the supply chain. Blockchain's immutable and distributed ledger system ensures that all transactions and data are recorded transparently and can be audited at any time.

- Key Features:
 - o End-to-End Visibility: Blockchain records every step of a product's journey, from cultivation and harvesting to distribution and retail.
 - o Authenticity Verification: Consumers can verify claims such as "organic," "non-GMO," or "sustainably sourced" through tamper-proof records.
 - o Enhanced Recall Efficiency: In cases of contamination or safety concerns, blockchain can pinpoint affected batches swiftly, minimizing waste and protecting public health.
- Use Case Example:
 - o Walmart and IBM Food Trust: Walmart uses blockchain to trace the origin of food products like mangoes and leafy greens. What once took days to trace now takes just seconds, enhancing both safety and efficiency.

Real-Time Tracking of Crops and Livestock

Real-time tracking using blockchain, often integrated with IoT devices and sensors, enables stakeholders to monitor the condition, location, and status of agricultural products and livestock in real time.

- Crops:
 - o Sensors can record data such as temperature, humidity, and handling conditions during transportation and storage.
 - o Blockchain ensures this data is securely logged and accessible to all stakeholders, ensuring that products meet quality standards.



- Livestock:
 - Blockchain can record the life history of livestock, including breeding, health records, and feed details.
 - This transparency builds trust with consumers and ensures compliance with ethical and health regulations.
- Benefits:
 - Reduces losses caused by spoilage during transportation and storage.
 - Enables informed decision-making for producers, distributors, and consumers.
- Use Case Example:
 - Te-Food: A blockchain-based solution in Vietnam used for livestock tracking, enabling stakeholders to trace meat products from the farm to the consumer.

Impact of Supply Chain Transparency

1. Consumer Trust: Shoppers are increasingly demanding transparency regarding the origin and handling of their food. Blockchain provides verifiable data, enhancing consumer confidence.
2. Food Safety: The ability to track and trace food at every stage reduces the risk of contamination and ensures compliance with safety standards.
3. Efficiency Gains: Automated data recording and real-time visibility reduce manual processes, improving operational efficiency and reducing costs.

2.2 Reducing Food Waste

Blockchain technology offers innovative solutions to one of the most pressing issues in agriculture and food systems: food waste. By streamlining logistics and inventory management and ensuring the freshness of food products through improved tracking and storage, blockchain can help significantly reduce food waste, benefiting both the environment and the economy.

Streamlining Logistics and Inventory Management

Blockchain enhances efficiency in the logistics and inventory management processes by providing a unified, transparent platform for all stakeholders in the supply chain.

- Challenges in Current Systems:
 - Mismatches between supply and demand often lead to overproduction or spoilage.
 - Inefficiencies in transportation and storage result in delays and losses.
- Blockchain's Role:
 - Real-Time Data Sharing: Blockchain enables real-time sharing of inventory levels and demand forecasts among producers, distributors, and retailers, reducing overproduction and ensuring timely delivery.
 - Automated Smart Contracts: These facilitate seamless transactions between parties, triggering shipments or payments based on pre-set conditions, reducing delays and manual errors.
 - Coordination Across Stakeholders: Blockchain's decentralized ledger ensures all participants have access to the same data, enhancing collaboration and reducing miscommunication.
- Use Case Example:
 - GrainChain: A blockchain platform that optimizes grain logistics, enabling efficient tracking and reducing losses due to mismanagement or delays.

Ensuring Freshness Through Improved Tracking and Storage

Blockchain, often integrated with IoT devices, provides accurate and real-time tracking of food products, ensuring that they are stored and transported under optimal conditions.

- Challenges in Current Systems:
 - Perishable goods are vulnerable to spoilage if not stored or transported correctly.
 - Lack of visibility into handling conditions leads to quality degradation and waste.
- Blockchain's Role:
 - Continuous Monitoring: IoT sensors can monitor temperature, humidity, and handling conditions, with data securely logged on the blockchain.
 - Traceability for Freshness: Blockchain records the journey of food products, ensuring that they reach consumers while still fresh.
 - Dynamic Shelf Life Management: Retailers can use blockchain data to prioritize the sale of products nearing the end of their shelf life, reducing waste.



- Use Case Example:
 - IBM Food Trust: By integrating blockchain with IoT, retailers can monitor and adjust the storage and transportation conditions of perishable goods like seafood, fruits, and vegetables, ensuring freshness upon arrival.

Impact of Reducing Food Waste

1. Environmental Benefits:
 - Reduced greenhouse gas emissions from decomposing food waste.
 - Optimized resource use in agriculture, including water and energy.
2. Economic Gains:
 - Lower costs for producers and retailers due to reduced losses.
 - Higher profitability through efficient inventory turnover.
3. Consumer Benefits:
 - Fresher, higher-quality products on store shelves.
 - Enhanced trust in the food supply chain due to transparency.

2.3 Smart Contracts for Transactions

Smart contracts, powered by blockchain technology, are self-executing contracts with the terms of the agreement directly written into code. They automate transactions and enforce agreements without the need for intermediaries, making them a valuable tool for transforming financial and operational transactions in agriculture.

Automating Payments

Smart contracts streamline payment processes between farmers, distributors, and retailers, reducing delays and ensuring fair compensation.

- Challenges in Traditional Payment Systems:
 - Payment delays due to manual processing or reliance on intermediaries.
 - Disputes arising from lack of trust or documentation.
- Smart Contract Solutions:
 - Instant Payments: Payments are automatically executed once predefined conditions are met (e.g., delivery confirmation).
 - Reduced Transaction Costs: By eliminating intermediaries, smart contracts lower transaction fees.
 - Transparency: All parties have access to a tamper-proof record of the transaction, reducing disputes.
- Use Case Example:
 - AgriDigital: This blockchain platform automates payments for grain farmers in Australia. Farmers receive payments instantly upon delivery, eliminating traditional delays.

Automating Contracts Between Stakeholders

Smart contracts enable seamless agreements between farmers, distributors, and retailers, ensuring trust and efficiency throughout the supply chain.

- Key Features:
 - Conditional Execution: Terms such as product delivery, quality checks, and timelines are coded into the contract. The contract self-executes only when all conditions are met.
 - Eliminating Paperwork: Digital smart contracts reduce the need for cumbersome paperwork, saving time and reducing errors.
 - Improved Accountability: Every party's obligations are clearly defined and enforced automatically, reducing the risk of breach of contract.
- Example:
 - A smart contract between a farmer and a retailer could include terms such as:
 - Quantity and quality of produce to be delivered.
 - Timeframe for delivery.
 - Automatic release of payment once the retailer confirms receipt and quality inspection via blockchain.

Benefits of Smart Contracts in Agriculture

1. For Farmers:
 - Quicker payments improve cash flow, especially for smallholder farmers.



- Greater bargaining power by reducing reliance on middlemen.
- 2. For Distributors and Retailers:
 - Enhanced trust with automated and verifiable contracts.
 - Reduced administrative overhead through automation.
- 3. For the Supply Chain as a Whole:
 - Increased efficiency and transparency lead to lower costs and fewer disputes.
 - Improved collaboration and accountability among stakeholders.

Impact of Smart Contracts on Agriculture

By automating payments and contracts, blockchain smart contracts reduce inefficiencies and foster equitable relationships in agricultural supply chains. This not only enhances trust but also creates a more sustainable and economically viable system for all stakeholders involved.

2.4 Enhancing Sustainability

Blockchain technology plays a critical role in advancing sustainability in agriculture. By certifying organic and sustainable farming practices and reducing the reliance on intermediaries, blockchain supports ethical practices while improving farmers' incomes and reducing environmental impacts.

Certifying Organic and Sustainable Farming Practices

Consumers are increasingly demanding products that are organic, ethically produced, and environmentally friendly. Blockchain provides a reliable mechanism for verifying and certifying these claims.

- Challenges with Traditional Certification:
 - Time-consuming and costly processes.
 - Risk of fraud or misrepresentation in the supply chain.
- Blockchain's Role:
 - Immutable Records: Blockchain creates tamper-proof records of farming practices, ensuring the authenticity of claims such as "organic" or "fair trade."
 - Auditable Supply Chains: Every stage, from cultivation to retail, is documented and accessible for verification.
 - Real-Time Data: Farmers can use IoT devices to log real-time data on soil health, water usage, pesticide application, and more, which is stored on the blockchain as evidence of sustainable practices.
- Use Case Example:
 - Ripe.io: This blockchain platform tracks the journey of organic and sustainably farmed produce, providing consumers with detailed information about the origins and farming methods of their food.

Reducing Reliance on Intermediaries and Improving Farmers' Income

Blockchain technology enables direct interactions between farmers and buyers, reducing dependence on intermediaries who often diminish profits for producers.

- Challenges in Traditional Systems:
 - Farmers, especially smallholders, face exploitation by middlemen who take a significant share of the profits.
 - Lack of direct market access results in lower prices for farmers and higher costs for consumers.
- Blockchain's Role:
 - Peer-to-Peer Transactions: Farmers can sell their produce directly to retailers or consumers using blockchain platforms, ensuring fair pricing.
 - Smart Contracts: Automates payment upon delivery, ensuring timely and secure transactions.
 - Transparent Market Data: Blockchain provides real-time market data, empowering farmers to make informed pricing and sales decisions.
- Use Case Example:
 - AgriLedger: A blockchain-based platform that connects farmers in developing countries directly with buyers, ensuring fair compensation and reducing exploitation by intermediaries.

Benefits of Blockchain for Sustainability

1. For the Environment:
 - Encourages practices like crop rotation, organic farming, and reduced chemical usage by verifying and rewarding sustainable efforts.



- Reduces food waste and inefficiencies, conserving resources such as water and energy.
- 2. For Farmers:
 - Increases income through direct market access and premium pricing for certified sustainable products.
 - Builds trust and long-term relationships with buyers through verified practices.
- 3. For Consumers:
 - Ensures transparency, allowing informed purchasing decisions.
 - Promotes ethical and environmentally responsible consumption.

Impact of Enhancing Sustainability

Blockchain aligns agricultural practices with sustainable development goals, supporting:

- Economic sustainability by improving farmers' livelihoods.
- Environmental sustainability by encouraging eco-friendly farming methods.
- Social sustainability by fostering trust and equity in food supply chains.

3. CASE STUDIES

3.1 IBM Food Trust

- **Collaboration with Walmart, Nestlé, and others to ensure food safety and traceability.**

This section examines real-world applications of blockchain in agriculture, showcasing its transformative potential. One prominent example is IBM Food Trust, a blockchain platform dedicated to improving food safety, traceability, and supply chain efficiency.

3.1 IBM Food Trust

IBM Food Trust is a blockchain-based platform that connects stakeholders across the food industry to ensure transparency and accountability. It leverages blockchain's immutable ledger to track food products from farm to fork, addressing issues like contamination, fraud, and inefficiencies.

Collaboration with Walmart, Nestlé, and Other Industry Leaders

IBM Food Trust has partnered with major players in the food industry, including Walmart, Nestlé, Dole, Unilever, and Carrefour. These collaborations highlight blockchain's potential to tackle critical challenges in food safety and traceability.

- **Walmart:**
Walmart uses IBM Food Trust to trace produce like leafy greens and mangoes. The platform reduced the time required to trace a batch of mangoes from 7 days to just 2.2 seconds. This efficiency enhances food safety by enabling rapid responses to contamination and recalls.
- **Nestlé:**
Nestlé uses IBM Food Trust to verify the origin of products like baby food and coffee. Consumers can scan QR codes on packaging to access detailed information about sourcing and production, building trust through transparency.
- **Carrefour:**
Carrefour uses IBM Food Trust to certify the authenticity of organic and premium products. Blockchain enables the company to share verified data about farming practices and product origins with consumers.

Features of IBM Food Trust

1. Enhanced Traceability:
 - Tracks every step of a product's journey, ensuring end-to-end visibility.
 - Enables rapid identification of contamination sources, minimizing the impact of foodborne illnesses.
2. Improved Food Safety:
 - Secure, real-time data sharing among stakeholders helps maintain high safety standards.
 - Automated alerts for anomalies in the supply chain ensure swift corrective actions.
3. Consumer Transparency:
 - Provides consumers with access to verified information about the products they purchase, fostering trust in brands.
4. Sustainability:
 - Reduces food waste by optimizing supply chain logistics.
 - Supports sustainable practices by certifying eco-friendly and ethical farming methods.

Impact and Benefits

- For Consumers:



- Increased confidence in the safety and authenticity of food products.
 - Empowered decision-making through access to verified product data.
- For Producers and Retailers:
 - Enhanced operational efficiency and reduced costs through streamlined supply chain processes.
 - Improved brand reputation and customer loyalty due to transparency and accountability.
- For the Food Industry:
 - Stronger regulatory compliance with accurate and auditable records.
 - Reduced food waste and environmental impact through better inventory management.

Key Takeaways

IBM Food Trust exemplifies how blockchain can revolutionize food supply chains by enhancing safety, transparency, and sustainability. Its successful collaborations with industry leaders demonstrate the scalability and practicality of blockchain solutions in addressing the challenges of modern agriculture.

3.2 AgriDigital

AgriDigital is an Australian blockchain-based platform revolutionizing grain supply chains by improving traceability, streamlining transactions, and ensuring timely payments for farmers. Since its launch in 2016, the platform has addressed key challenges in the agricultural sector, such as inefficiencies, lack of trust, and payment delays, particularly benefiting grain farmers and supply chain participants.

Blockchain for Grain Supply Chains

AgriDigital leverages blockchain technology to create a transparent, secure, and efficient grain supply chain. It digitizes the processes of buying, selling, and storing grain, ensuring accurate and accessible records for all stakeholders.

- Traceability:
 - Tracks the journey of grain from the farm to the consumer, documenting details such as origin, quality, and storage conditions.
 - Provides buyers with confidence in product authenticity and quality.
- Data Transparency:
 - Records transactions in an immutable ledger accessible to farmers, buyers, and regulators.
 - Reduces disputes by ensuring all parties have access to the same verified data.
- Inventory Management:
 - Offers real-time updates on grain quantities and locations, optimizing storage and reducing waste.

Blockchain for Farmer Payments

One of the critical features of AgriDigital is its focus on automating and securing payments to farmers, addressing long-standing issues of delayed or defaulted payments.

- Challenges Addressed:
 - Traditional payment systems often leave farmers waiting weeks or months to receive their earnings.
 - Payment defaults by buyers can severely impact smallholder farmers' financial stability.
- AgriDigital's Solutions:
 - Smart Contracts: Automates payment transactions by releasing funds instantly when agreed conditions are met, such as delivery confirmation and quality checks.
 - Secure Payments: Ensures that farmers are paid in full and on time, fostering trust and financial stability.
 - Digital Escrow: Temporarily holds funds during transactions to protect both buyers and sellers, reducing the risk of fraud.

Impact and Benefits

- For Farmers
 - Faster and more reliable payments improve cash flow and reduce financial stress.
 - Access to a transparent marketplace empowers farmers to negotiate fair prices.
- For Buyers
 - Ensures quality control and product authenticity through traceable supply chains.
 - Simplifies procurement processes, reducing administrative overhead.



- For the Industry
 - Reduces inefficiencies and transaction costs across the supply chain.
 - Strengthens trust and collaboration among stakeholders by providing a unified platform for data sharing.

Case Example

In its pilot phase, AgriDigital successfully completed the world's first blockchain-enabled grain sale. A farmer sold 23.46 tons of wheat to a buyer, with payment and title transfer executed instantly via the blockchain. This milestone demonstrated the practical application of blockchain in creating more efficient and secure agricultural supply chains.

Key Takeaways

AgriDigital exemplifies the power of blockchain to solve real-world challenges in agriculture, from enhancing supply chain traceability to ensuring prompt and secure payments for farmers. By empowering stakeholders and fostering transparency, AgriDigital contributes to creating a more sustainable, equitable, and efficient agricultural ecosystem.

3.3 Ripe.io

Ripe.io is a blockchain-based platform focused on building trust in food provenance through data analytics. The company uses blockchain to track and verify the journey of food products from farm to table, providing consumers with verifiable information about the quality, sustainability, and authenticity of their food. By combining blockchain technology with data analytics, Ripe.io aims to improve transparency, ensure food safety, and empower consumers to make informed purchasing decisions.

Building Trust in Food Provenance

Ripe.io's platform integrates blockchain with Internet of Things (IoT) sensors and data analytics to create a detailed record of each food product's journey, ensuring that it reaches consumers with verified information about its origin, handling, and quality.

- Blockchain's Role:
 - Immutable Data Records: Blockchain stores key data points about the food's provenance, such as the farm where it was grown, the methods of cultivation (e.g., organic or sustainable farming), and processing details.
 - Transparency: Consumers can access this information at any time, typically via a QR code on the product packaging, building trust and enhancing food safety.
- Integration with IoT:
 - IoT sensors track critical factors such as temperature, humidity, and storage conditions during transport, ensuring that products are handled properly throughout the supply chain.
 - Data from these sensors is recorded in real time on the blockchain, providing up-to-date information about the condition of the product.

Data Analytics for Food Quality and Sustainability

Ripe.io doesn't just track products; it also analyzes the data to provide deeper insights into food quality, sustainability, and production practices. This data analytics approach can be used by both producers and consumers to make better decisions regarding food sourcing and purchasing.

- Data Analytics Features:
 - Sustainability Metrics: The platform tracks the environmental impact of food production, such as water usage, carbon emissions, and the sustainability of farming practices.
 - Quality Assurance: By analyzing data throughout the supply chain, Ripe.io can identify inefficiencies and suggest improvements in areas like storage, transport, and handling, helping to maintain the quality of food products.
 - Farmers and Retailers: Ripe.io provides farmers and retailers with valuable insights into the supply chain, helping them optimize operations and improve product quality.

Impact and Benefits

- For Consumers:
 - Increased Trust: Consumers can scan QR codes to access verified data about the food's origin, cultivation methods, and handling, building confidence in the food they purchase.
 - Informed Decisions: Transparency empowers consumers to make ethical choices, such as choosing sustainably sourced or organic products.
- For Farmers and Producers:
 - Market Access: Farmers can use Ripe.io's platform to demonstrate their commitment to quality and sustainability, making their products more attractive to conscious consumers and retailers.



- Data-Driven Decisions: Farmers benefit from insights that help optimize their operations, reduce waste, and improve the quality of their products.
- For Retailers:
 - Consumer Confidence: Retailers benefit from higher customer loyalty by offering products with verified provenance and sustainability credentials.
 - Supply Chain Optimization: Blockchain data can help streamline logistics, reduce spoilage, and optimize inventory management.

Case Example

One of Ripe.io's key partnerships is with Driscoll's, a leading global producer of fresh berries. Ripe.io worked with Driscoll's to track and verify the journey of their strawberries. By scanning a QR code, consumers can access detailed information about where the strawberries were grown, how they were handled, and the sustainability practices of the farm. This transparency helps build consumer confidence in Driscoll's products and promotes sustainable farming practices.

Key Takeaways

Ripe.io exemplifies how blockchain, when combined with data analytics, can create a more transparent, sustainable, and trustworthy food system. By enabling real-time tracking and providing actionable insights into food provenance, quality, and sustainability, Ripe.io helps foster greater consumer trust and empowers producers to improve their practices. This case study demonstrates how blockchain can be a powerful tool for promoting transparency in the food industry, ensuring that the food we eat is not only safe but also ethically and sustainably sourced.

4. BENEFITS OF BLOCKCHAIN IN AGRICULTURE

Blockchain technology offers numerous advantages for the agricultural sector, ranging from improving transparency to fostering sustainability. The following benefits are crucial for transforming agricultural supply chains and creating a more efficient, ethical, and transparent system.

1. Enhanced Trust and Accountability

Blockchain's decentralized and immutable ledger fosters a new level of trust and accountability across the agricultural supply chain.

- Immutable Records: All transactions and data points recorded on the blockchain are permanent and cannot be altered, ensuring transparency.
- Verified Information: Consumers and stakeholders can access verified data about the food's origin, quality, and handling, reducing concerns about fraud and misrepresentation.
- Accountability: Each party in the supply chain, from farmers to retailers, is held accountable for their actions. The transparency of blockchain ensures that any discrepancies or issues (e.g., food contamination or product mislabeling) can be traced back to their source.

Impact:

- Builds consumer trust, as they can independently verify the provenance and quality of food products.
- Encourages ethical behavior among stakeholders, knowing their actions are visible and accountable.

2. Improved Supply Chain Efficiency

Blockchain simplifies and streamlines supply chain processes, making the entire agricultural system more efficient.

- Real-Time Tracking: Blockchain enables real-time data sharing between producers, distributors, and retailers, improving coordination and minimizing delays.
- Smart Contracts: Automate transactions, reducing paperwork, manual errors, and delays in payment or delivery.
- Reduced Intermediaries: Blockchain facilitates peer-to-peer transactions, cutting out middlemen and lowering transaction costs.
- Inventory Management: Blockchain's transparency improves inventory management by providing accurate, up-to-date information about stock levels and product movement.

Impact:

- Faster, more accurate transactions, reducing delays and inefficiencies in the supply chain.
- Lower operational costs, particularly by eliminating intermediaries and streamlining processes.
- Optimized resource use, with better management of supplies and reduced wastage.



3. Strengthened Food Safety Protocols

Blockchain plays a pivotal role in enhancing food safety through its traceability and real-time monitoring capabilities.

- **End-to-End Traceability:** Blockchain records every step of a food product's journey from farm to table, making it easier to identify the origin of any contamination or quality issue.
- **Faster Recall Processes:** In the event of contamination, blockchain allows for quick and efficient recalls by enabling rapid identification of affected batches, minimizing health risks.
- **IoT Integration:** Combining blockchain with IoT devices allows for continuous monitoring of critical factors like temperature, humidity, and handling conditions, ensuring that food is stored and transported correctly.
- **Regulatory Compliance:** Blockchain's audit trail helps farmers and companies comply with food safety regulations and certifications, making inspections and audits more transparent.

Impact:

- Increased food safety, as contamination or quality issues can be quickly traced back to their source.
- Reduced public health risks through faster and more effective recalls.
- Greater consumer confidence in food safety and quality standards.

4. Support for Ethical and Sustainable Practices

Blockchain technology encourages and certifies sustainable and ethical practices across the agricultural sector, promoting long-term environmental and social benefits.

- **Certification of Sustainability:** Blockchain can be used to verify and certify organic, fair trade, or sustainable farming practices, providing transparency and credibility to environmentally conscious consumers.
- **Monitoring Sustainability:** Blockchain enables real-time tracking of environmental factors like water usage, carbon emissions, and waste management, encouraging farmers to adopt more sustainable practices.
- **Empowering Smallholder Farmers:** By reducing the reliance on intermediaries, blockchain enables farmers to access direct markets, often allowing them to command better prices for sustainably grown products.
- **Consumer Choice:** Blockchain allows consumers to make more informed choices about the products they purchase, supporting a shift toward ethically and sustainably sourced food.

Impact:

- Encourages the adoption of sustainable agricultural practices, helping farmers reduce their environmental footprint.
- Provides consumers with the information needed to make ethical purchasing decisions.
- Promotes fair trade and enhances the livelihoods of smallholder farmers by offering transparency and direct access to markets.

5. CHALLENGES AND LIMITATIONS

While blockchain holds great potential for revolutionizing agriculture, its widespread adoption is impeded by several challenges. These challenges include technological barriers, scalability issues, data privacy concerns, and more. In this section, we will address the key obstacles to the integration of blockchain into agricultural systems.

5.1 Technological Barriers

Blockchain technology faces several technological challenges that limit its effectiveness and adoption in the agricultural sector.

Limited Digital Infrastructure in Rural Areas

- **Challenge:** Many rural and remote farming communities lack the necessary digital infrastructure, such as reliable internet access, smartphones, and computers, to fully leverage blockchain solutions.
- **Impact:**
 - **Limited Access to Blockchain Platforms:** Farmers in rural areas may face difficulties accessing or using blockchain platforms due to connectivity issues, preventing them from participating in digital ecosystems that rely on real-time data sharing.
 - **Interruption in Data Flow:** Blockchain platforms depend on accurate, real-time data (often gathered through IoT sensors). Poor connectivity can disrupt this data flow, limiting the effectiveness of blockchain-based supply chains.
 - **Digital Literacy:** Many farmers in these regions may not have the skills to use advanced technological platforms, making blockchain adoption more challenging.
- **Potential Solutions:**
 - **Infrastructure Development:** Governments and private companies should invest in improving internet connectivity and access to digital devices in rural areas.



- Mobile-Based Solutions: Blockchain applications designed for mobile devices can help bridge the digital divide and enable farmers to engage with the technology on their smartphones.
- Training Programs: Initiatives to improve digital literacy and provide blockchain-related education can help farmers and other stakeholders better understand and utilize blockchain technology.

High Costs of Implementation

- Challenge: The implementation of blockchain solutions often involves significant costs, which can be a major obstacle, particularly for smallholder farmers and agricultural businesses.
- Impact:
 - Initial Setup Costs: The cost of deploying blockchain technology, including the installation of necessary hardware (e.g., IoT sensors) and software (e.g., blockchain platforms), can be prohibitively expensive for smaller farms.
 - Operational Costs: Ongoing maintenance and the operational costs of running blockchain networks, such as transaction fees or system updates, can further increase the financial burden.
 - Integration with Existing Systems: Blockchain adoption often requires upgrading or overhauling existing agricultural processes, which adds to the cost and complexity.
- Potential Solutions:
 - Government Support and Subsidies: Financial assistance, such as grants or low-interest loans, could help smaller farms and producers bear the initial costs of blockchain adoption.
 - Collaborative Models: Smaller farmers can form cooperatives or join existing blockchain networks to reduce costs through collective investment and shared resources.
 - Scalable Solutions: Platforms that offer scalable blockchain solutions—adjusting to the size and needs of farms—could make adoption more affordable and accessible.

5.2 Scalability and Interoperability

As blockchain technology continues to evolve, it faces significant challenges in terms of scalability and interoperability within agricultural systems.

Ensuring Compatibility Across Various Blockchain Systems

- Challenge: The growing number of blockchain platforms and networks presents scalability and interoperability issues. Different blockchain systems may use incompatible protocols, making it difficult to create a unified ecosystem across global agricultural supply chains.
- Impact:
 - Fragmented Systems: Agriculture often involves multiple stakeholders across various regions and platforms, and incompatible blockchain systems can hinder collaboration and information sharing.
 - Complex Integration: Integrating new blockchain solutions with existing technologies (such as legacy systems in farms or agribusinesses) can be complex and costly.
 - Data Silos: If different blockchain systems are unable to share information seamlessly, it can result in fragmented data and inefficient processes across supply chains.
- Potential Solutions:
 - Standardization: The development of industry-wide blockchain standards and protocols can help ensure compatibility across platforms and enhance interoperability.
 - Interoperability Frameworks: Creating frameworks that enable different blockchain systems to communicate and share data will help build a more connected and efficient supply chain.
 - Modular Platforms: Designing blockchain solutions that can be easily integrated with various technologies and existing systems will enable broader adoption and scalability.

5.3 Data Privacy and Security

While blockchain is renowned for its transparency, it also poses challenges when it comes to maintaining the balance between privacy and security.

Balancing Transparency with Confidentiality

- Challenge: Blockchain's transparency—where all transactions are publicly recorded on a distributed ledger—can conflict with the need to protect sensitive information, such as business strategies, financial details, and private data from farmers.
- Impact:



- Privacy Concerns: Farmers, especially those in smaller operations, may be reluctant to share sensitive business or personal information due to concerns over data exposure.
- Sensitive Data: Certain types of data, like pricing information, production processes, or contracts, could be exploited if made too transparent.
- Regulatory Compliance: In some jurisdictions, data protection laws (e.g., GDPR in Europe) require specific protections for personal data, which may conflict with blockchain's open nature.
- Potential Solutions:
 - Private Blockchains: Implementing permissioned or private blockchains, where only authorized parties have access to certain data, can address privacy concerns while still benefiting from blockchain's integrity.
 - Zero-Knowledge Proofs: Techniques like zero-knowledge proofs (ZKPs) allow for data to be verified without revealing the actual information, providing a solution for maintaining confidentiality.
 - Data Encryption: Encrypting sensitive data on the blockchain ensures that it is secure and only accessible by authorized parties, while still preserving the benefits of blockchain transparency.

6. FUTURE PROSPECTS

As blockchain technology continues to evolve, its integration with other emerging technologies, as well as supportive policies and incentives, will unlock new opportunities for the agricultural sector. In this section, we explore the future prospects of blockchain in agriculture, focusing on its integration with IoT and AI, policymaking to promote adoption, and the potential for scaling blockchain solutions globally.

6.1 Integration of Blockchain with IoT and AI for Predictive Analytics in Agriculture

The integration of blockchain with the Internet of Things (IoT) and Artificial Intelligence (AI) is poised to revolutionize agriculture, providing farmers with advanced tools for decision-making and enhancing the efficiency of supply chains.

- IoT and Blockchain Synergy:
 - Real-Time Data Collection: IoT devices, such as sensors placed in the soil or on livestock, gather real-time data on factors like temperature, moisture, and health. Blockchain securely records this data in an immutable ledger, ensuring its integrity and availability for stakeholders.
 - Automated and Transparent Data Flow: Blockchain allows for seamless sharing of data across various platforms and stakeholders, enhancing transparency and ensuring that data from IoT devices is easily accessible and verifiable.
- AI and Blockchain Synergy:
 - Predictive Analytics: AI can analyze the data collected through IoT sensors, providing farmers with predictive insights on crop yield, disease outbreaks, or market trends. This can help optimize production schedules, reduce waste, and improve overall crop management.
 - Automated Decision-Making: AI algorithms, combined with blockchain's secure data storage, can automate decision-making in areas such as irrigation management, pest control, and crop rotation, ensuring more efficient resource usage.
- Future Impact:
 - Precision Agriculture: With real-time data and predictive analytics, farmers can practice precision agriculture, optimizing inputs (water, fertilizers, etc.) for each individual crop, reducing environmental impact, and increasing yields.
 - Enhanced Sustainability: Blockchain-enabled IoT and AI systems will help farmers adopt more sustainable practices by offering insights into soil health, water usage, and carbon emissions, allowing them to reduce their environmental footprint.

6.2 Policymaking to Incentivize Blockchain Adoption in Developing Regions

For blockchain to reach its full potential in agriculture, particularly in developing countries, effective policies and incentives will be crucial in overcoming the barriers to adoption.

- Government Support:
 - Subsidies and Grants: Governments can offer financial assistance to farmers and agribusinesses to offset the initial costs of adopting blockchain technology. Subsidies or low-interest loans can help make the technology more affordable and accessible, particularly for smallholder farmers in developing regions.
 - Public-Private Partnerships: Collaboration between governments, technology providers, and agribusinesses can help create blockchain solutions tailored to the specific needs of developing countries, ensuring that they are cost-effective and scalable.
- Regulatory Frameworks:



- Blockchain Standards: Developing common standards and regulatory frameworks for blockchain in agriculture will ensure that the technology can be adopted across different regions without legal or technical barriers. Governments should work with international organizations to create guidelines for data privacy, traceability, and interoperability.
- Data Protection and Privacy: Policymakers must balance transparency with data privacy by enacting regulations that ensure sensitive data, particularly personal or financial information, is protected on the blockchain.
- Incentives for Sustainable Practices:
 - Blockchain for Certification: Policymakers can encourage blockchain adoption by promoting the use of blockchain for certifying sustainable and ethical farming practices, such as organic certifications or fair trade. This would allow farmers in developing regions to access global markets that value ethical sourcing and sustainability.
- Future Impact:
 - Increased Adoption: With the right policies in place, blockchain adoption can accelerate in developing regions, empowering smallholder farmers with better access to markets, enhanced transparency, and improved productivity.
 - Economic Growth: Blockchain's potential to reduce inefficiencies in agricultural supply chains can help boost agricultural productivity and economic growth in developing countries, creating new opportunities for farmers and local communities.

6.3 Potential to Scale Blockchain Solutions Globally

Blockchain technology has the potential to scale beyond individual farms or countries, creating global networks that connect producers, consumers, and stakeholders in a more efficient, transparent, and sustainable agricultural ecosystem.

- Global Supply Chain Integration:
 - Blockchain can enable the creation of a global, interconnected agricultural supply chain that is transparent, secure, and verifiable. By linking farmers, processors, distributors, and retailers on a single platform, blockchain can ensure that all participants are operating under the same standards and protocols, regardless of their geographic location.
 - Cross-Border Trade: Blockchain's decentralized nature can facilitate smoother cross-border trade by reducing paperwork, streamlining payments, and ensuring compliance with international standards. This can benefit farmers by opening new markets and reducing the complexity of exporting goods.
- Scalability of Blockchain Solutions:
 - As blockchain networks grow, they will become more efficient, capable of handling larger amounts of data and more transactions. This scalability will allow blockchain solutions to expand globally and accommodate the growing demand for agricultural products and services.
 - Interoperability: The development of standardized protocols and interoperable systems will make it easier for different blockchain platforms to communicate, allowing for a seamless exchange of information across regions and agricultural sectors.
- Future Impact:
 - Global Traceability: Blockchain's ability to track food products from farm to table will enable consumers to verify the origin of food products, ensuring food safety and quality on a global scale. This could help reduce food fraud and increase consumer confidence in the food supply chain.
 - Increased Market Access: By providing farmers with access to global markets, blockchain can increase trade opportunities and enable farmers to receive fairer prices for their products, particularly in emerging markets.
 - Sustainable Global Agriculture: Blockchain can help scale sustainability initiatives by tracking the environmental impact of farming practices, ensuring that global agricultural practices are more sustainable and less harmful to the environment.

7. CONCLUSION

Blockchain technology holds transformative potential for the agricultural sector, offering innovative solutions to some of the most pressing challenges faced by the industry today. By enhancing transparency, traceability, and efficiency across food supply chains, blockchain can improve food safety, reduce waste, and promote sustainability. It can also empower farmers, particularly smallholders, by providing them with access to global markets, fairer payment systems, and a more transparent way to certify their practices.

However, the widespread adoption of blockchain in agriculture is not without challenges. Technological barriers, such as limited digital infrastructure in rural areas, high costs of implementation, and issues related to data privacy and security, need to be addressed. Additionally, the scalability and interoperability of blockchain systems must be improved to create seamless global supply chains. Despite these obstacles, the continued advancement of blockchain technology, alongside supportive policymaking and investment in infrastructure, could accelerate its adoption and implementation.

With the right frameworks in place, blockchain has the potential to transform agriculture into a more equitable, efficient, and sustainable industry. By addressing these challenges and leveraging the opportunities blockchain offers, the agricultural sector can evolve into a



more transparent and resilient system that benefits all stakeholders—from farmers to consumers, and from local communities to the global market.

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PSYCHOLOGICAL STATE OF PHYSICAL EDUCATION STUDENTS' AFFECTING THEIR PERFORMANCE IN A COLLEGE IN GUANGDONG, CHINA

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ABSTRACT

This study explores the impact of psychological states, specifically anxiety and self-confidence, on the performance of physical education students in a college in Guangdong, China. Employing a descriptive-correlational research design, the study analyzed data from 398 students using validated questionnaires with high reliability (Cronbach's alpha: anxiety = 0.971, self-confidence = 0.968). Results revealed a significant inverse relationship between anxiety and self-confidence ($r = 0.638$, $p < 0.001$), with higher self-confidence correlating to lower anxiety levels. The findings also indicated that anxiety levels negatively influenced performance, while the relationship between self-confidence and performance was complex, with high self-confidence not always leading to better outcomes. The study highlights the importance of integrating psychological support into physical education programs to foster optimal student performance. Implications include the need for targeted interventions, professional development for instructors, and personalized support systems. Future research should investigate longitudinal patterns, cross-cultural comparisons, and intervention effectiveness to further understand these dynamics.

KEYWORDS: *Psychological States, Physical Education Performance, Anxiety and Self-Confidence, Higher Education in China*

1. INTRODUCTION

The psychological state of students plays a crucial role in their academic and personal development, particularly in physical education settings where both mental and physical performance are intrinsically linked. Recent studies have highlighted the significant impact of psychological factors such as anxiety and self-confidence on student performance in physical education (Deasy et al., 2022). In China, where there is an increasing emphasis on physical education and sports programs, understanding these psychological dynamics becomes particularly relevant for educational institutions and practitioners. The complex interplay between mental states and physical performance creates unique challenges and opportunities for educators striving to optimize student learning outcomes in physical education environments.

The relationship between psychological states and performance in physical education has gained increased attention in recent years, with research indicating that students' mental well-being significantly influences their ability to engage effectively in physical activities and achieve optimal performance outcomes (Arabacı & Çankaya, 2017). This growing body of evidence suggests that psychological factors can either enhance or impede physical performance, making it essential for educators to understand and address these mental aspects alongside physical skill development. The integration of psychological support within physical education programs has become increasingly recognized as a crucial component for fostering comprehensive student development.

In the context of higher education, physical education students face unique pressures that can significantly impact their psychological well-being and subsequent performance. These pressures often stem from multiple sources, including academic expectations, physical performance standards, peer comparisons, and future career prospects. Understanding how these various factors interact and influence student performance is crucial for developing effective educational strategies and support systems. The college environment, with its increased emphasis on autonomous learning and professional development, presents both opportunities and challenges for managing student psychological states.



The Chinese educational landscape has witnessed significant transformations in recent years, particularly in its approach to physical education. These changes reflect a broader recognition of the importance of holistic student development and the role of physical education in achieving educational objectives. However, the psychological dimensions of physical education in Chinese higher education institutions remain relatively unexplored, despite their potential significance in determining student success. This gap in understanding presents an important opportunity for research that can inform educational practice and policy.

This study focuses specifically on examining how anxiety levels and self-confidence affect the performance of physical education students in a college setting in Guangdong, China. By investigating these relationships within a specific institutional context, this research aims to contribute to the broader understanding of psychological factors in physical education while providing practical insights for educators and administrators. The findings from this study have the potential to inform the development of targeted interventions and support mechanisms that can help students better manage their psychological states and optimize their academic and physical performance.

2. LITERATURE REVIEW

The examination of psychological states affecting physical education students' performance necessitates a comprehensive theoretical foundation. Previous research has established multiple theoretical frameworks that help explain the complex relationships between psychological factors and academic performance. These frameworks provide essential insights into how students' mental states influence their learning processes and outcomes in educational settings. While various theoretical approaches have been applied to understand this relationship, two theoretical frameworks stand out as particularly relevant for understanding the psychological dynamics in physical education: Social Cognitive Theory and Information Integration Theory.

2.1 Social Cognitive Theory

Social Cognitive Theory (SCT), developed by Albert Bandura, provides a fundamental framework for understanding how psychological states influence learning and performance. The theory emphasizes the dynamic and reciprocal interaction between personal factors, behavioral patterns, and environmental influences (Bandura, 1997). In the context of physical education, SCT suggests that students' self-efficacy beliefs and anxiety levels significantly impact their performance outcomes. This theoretical framework has proven particularly valuable in explaining how students' psychological states interact with their learning environment to influence their academic achievements.

The core premise of Social Cognitive Theory lies in its understanding of human behavior as a product of continuous reciprocal interaction between cognitive, behavioral, and environmental influences. This triadic reciprocal determinism explains how students in physical education settings develop and maintain certain behavioral patterns through the complex interplay of personal factors, such as their thoughts and beliefs, and environmental circumstances, including peer influence and institutional support systems. The theory's emphasis on the role of cognitive processes in learning and performance provides valuable insights into how students' psychological states can either facilitate or hinder their educational progress.

A particularly significant aspect of Social Cognitive Theory is its explanation of self-regulatory mechanisms through which students monitor and adjust their behavior. Research has shown that students with higher levels of self-efficacy tend to demonstrate better performance and greater resilience in challenging physical education tasks (Richardson et al., 2022). This relationship between self-efficacy and performance is mediated through various psychological processes, including goal-setting, self-evaluation, and emotional regulation. Understanding these mechanisms is crucial for developing effective interventions to support students' psychological well-being and enhance their academic performance.

Social Cognitive Theory also emphasizes the importance of observational learning and modeling in skill acquisition. In physical education contexts, this aspect of the theory helps explain how students learn not only physical skills but also coping strategies and emotional regulation techniques from their peers and instructors. The theory suggests that students' psychological states are significantly influenced by their observations of others' experiences and outcomes, contributing to the development of their own self-efficacy beliefs and anxiety management strategies.

The application of Social Cognitive Theory in physical education settings has led to important insights regarding the role of environmental factors in shaping students' psychological states. The theory highlights how institutional culture, teacher-student relationships, and peer interactions can significantly influence students' anxiety levels and self-confidence. This understanding has important implications for educational practice, suggesting that interventions aimed at improving students' psychological states should consider both individual and environmental factors.



2.2 Information Integration Theory

Information Integration Theory (IIT) provides a complementary perspective for understanding how students process and integrate various psychological factors affecting their performance. This theoretical framework offers a systematic approach to analyzing how individuals combine multiple sources of information to form judgments and make decisions in educational contexts. The theory's emphasis on cognitive processing and decision-making provides valuable insights into how students evaluate and respond to different aspects of their educational experience.

One of the fundamental principles of Information Integration Theory is its focus on how individuals weigh and combine different pieces of information to form overall impressions and make decisions. In the context of physical education, this theoretical framework helps explain how students integrate their anxiety experiences, self-confidence assessments, and performance feedback to regulate their behavior and academic engagement. This integration process is particularly relevant for understanding how students manage complex psychological states while participating in physical education activities.

Information Integration Theory also emphasizes the role of individual differences in information processing. Different students may assign varying weights to different aspects of their educational experience, leading to diverse psychological responses to similar situations. This understanding is crucial for developing personalized approaches to supporting students' psychological well-being and academic performance. The theory suggests that interventions should be tailored to account for individual differences in how students process and integrate information about their performance and capabilities.

The application of Information Integration Theory to physical education contexts has revealed important insights about how students combine multiple sources of feedback to form self-perceptions. This includes how they integrate formal performance assessments, peer comparisons, instructor feedback, and their own internal standards to evaluate their capabilities and progress. Understanding these integration processes is essential for developing effective feedback mechanisms that support positive psychological states and enhance learning outcomes.

A particularly valuable aspect of Information Integration Theory is its explanation of how students reconcile conflicting information about their performance and capabilities. The theory provides a framework for understanding how students manage discrepancies between their self-assessments and external feedback, which can significantly impact their psychological states and subsequent performance. This understanding is crucial for developing interventions that help students maintain healthy psychological states while processing potentially challenging feedback.

The practical implications of Information Integration Theory extend to the design of educational environments and assessment systems. The theory suggests that careful attention should be paid to how different sources of information are presented and structured to facilitate optimal integration and processing by students. This has important implications for how physical education programs are organized and how feedback is delivered to support positive psychological states and enhanced performance outcomes.

3. RESEARCH METHODOLOGY

The investigation of psychological states affecting physical education students' performance requires a carefully structured methodological approach that ensures both scientific rigor and practical relevance. The complexity of studying psychological factors in educational settings necessitates a comprehensive research design that can effectively capture and analyze the multifaceted nature of student experiences and performance outcomes. This study employed a systematic approach to data collection and analysis, incorporating both quantitative and qualitative elements to provide a thorough understanding of the relationships between psychological states and student performance.

3.1 Research Design

This study employed a descriptive-correlational research design to examine the relationship between psychological states and performance among physical education students. The research utilized quantitative methods to gather and analyze data regarding students' anxiety levels, self-confidence, and academic performance. This methodological approach was chosen for its ability to identify and measure relationships between variables while maintaining objectivity and reliability in data collection and analysis.

The research design incorporated multiple phases of data collection and analysis to ensure comprehensive coverage of the research objectives. The initial phase focused on establishing baseline measurements of psychological states, followed by systematic assessment of performance indicators and contextual factors that might influence the relationship between these variables. This multi-phase approach allowed for the identification of both direct and indirect relationships between psychological states and student performance.



The design also included provisions for controlling potential confounding variables through careful sample selection and statistical analysis techniques. This attention to methodological rigor helped ensure that the findings would accurately reflect the relationships being studied while minimizing the influence of external factors that could affect the validity of the results.

3.2 Research Subjects

The study involved 398 physical education students from a college in Guangdong, China. Participants were selected using proportional stratified random sampling, with representation across different academic years and specializations. The sample included both male (74.1%) and female (25.9%) students, with the majority falling within the 20-21 age range (65.8%). This sampling approach ensured adequate representation of different student subgroups while maintaining the randomness necessary for statistical validity.

The selection of participants followed a carefully structured protocol that considered multiple demographic and academic factors. This included stratification based on academic year, program specialization, and previous academic performance to ensure a representative sample of the student population. The sampling frame was constructed using official enrollment records, with random selection within each stratum to minimize selection bias.

The participation criteria were established to ensure that all participants had sufficient exposure to the physical education program to provide meaningful data. Students were required to have completed at least one full semester of physical education courses and to be actively enrolled in physical education activities at the time of the study. This criterion helped ensure that participants had adequate experience to reflect on their psychological states in relation to their physical education performance.

The demographic composition of the sample reflected the broader student population of the institution, with particular attention paid to maintaining proportional representation across different specializations and academic levels. The relatively high proportion of male students (74.1%) is consistent with the general enrollment patterns in physical education programs at the institution.

The final sample size of 398 students was determined through power analysis to ensure adequate statistical power for detecting significant relationships while accounting for potential attrition during the study period. This sample size exceeded the minimum requirements for the planned statistical analyses and allowed for robust examination of subgroup differences.

3.3 Research Instruments

Data collection utilized validated questionnaires measuring anxiety levels and self-confidence. The anxiety assessment tool included 38 items evaluating various aspects of anxiety manifestation, while the self-confidence questionnaire contained 32 items measuring different dimensions of self-confidence. Both instruments demonstrated high reliability with Cronbach's alpha values of 0.971 and 0.968 respectively, indicating strong internal consistency and reliability.

The development and selection of research instruments involved a rigorous process of evaluation and pilot testing. The anxiety assessment tool was adapted from established psychological measurement scales, with modifications to ensure relevance to the physical education context. Each item was carefully reviewed by a panel of experts in sports psychology and education to ensure content validity and cultural appropriateness for the Chinese educational context.

The self-confidence questionnaire was similarly developed through a systematic process that included literature review, expert consultation, and pilot testing. The instrument incorporated multiple dimensions of self-confidence relevant to physical education performance, including academic self-efficacy, physical competence, and social confidence. The questionnaire items were designed to capture both general and domain-specific aspects of self-confidence.

The instruments were administered under standardized conditions to ensure consistency in data collection. Clear instructions were provided to all participants, and trained research assistants were available to address any questions or concerns during the administration process. The questionnaires were completed in a controlled environment to minimize external influences on participant responses.

4. RESEARCH RESULTS

The analysis of data collected from the physical education students revealed several significant patterns regarding the relationship between psychological states and academic performance. The findings presented below emerged from rigorous statistical analysis of the survey responses, incorporating both descriptive and inferential statistical methods. These results provide valuable insights into how anxiety and self-confidence interact to influence student performance in physical education settings, with important implications for educational practice and student support.



4.1 Relationship Between Anxiety and Self-Confidence

Analysis revealed a significant correlation between anxiety levels and self-confidence ($r = 0.638$, $p < 0.001$). Students with higher self-confidence generally demonstrated lower anxiety levels, suggesting an inverse relationship between these psychological states. The overall correlation coefficient of 0.913 ($p < 0.001$) indicates a strong relationship between these variables and their impact on student performance. This strong statistical association underscores the interconnected nature of these psychological factors and their combined influence on student outcomes.

Table 1 Relationship Between Anxiety and Self-Confidence

Variable	Profile	Computed r	Sig	Decision on Ho	Interpretation
Level of Anxiety	Self-Confidence	0.638	0	Rejected	Significant
Overall	Overall	0.913	0	Rejected	Significant

The relationship between the self-assessment of the physical education student respondents on their level of anxiety and their self-assessment of self-confidence shows a significant positive correlation. The computed correlation coefficient (r) of 0.638 indicates a moderate to strong positive relationship between the two variables. This means that as students' self-confidence increases, their level of anxiety tends to decrease, and vice versa.

The significance value (p -value) of 0.000, which is less than the alpha level of 0.05, leads to the rejection of the null hypothesis (H_0). This indicates that the relationship between self-confidence and anxiety is statistically significant, meaning that the observed correlation is unlikely to be due to random chance.

The result suggests that students who report higher self-confidence tend to experience lower levels of anxiety, while those who have lower self-confidence are more likely to report higher anxiety levels. This finding is consistent with psychological research, which often shows that self-confidence can act as a protective factor against anxiety. The negative relationship between anxiety and self-confidence may indicate that fostering self-confidence could be a key strategy for helping students manage anxiety, particularly in academic and physical education settings.

Further examination of this relationship revealed interesting patterns across different student subgroups. The correlation between anxiety and self-confidence remained consistent across gender categories, suggesting that the relationship between these psychological states operates similarly for both male and female students. This consistency across gender groups indicates that the underlying mechanisms linking anxiety and self-confidence may be fundamental to student experience rather than gender-specific.

The analysis also revealed temporal patterns in the relationship between anxiety and self-confidence. Data collected at different points during the academic term showed that the strength of the correlation varied somewhat with academic pressure points, such as examination periods or major physical assessments. However, the inverse relationship between anxiety and self-confidence remained statistically significant throughout all measurement periods, indicating a robust and stable association between these psychological factors.

4.2 Analysis of Research Results

The statistical analysis of collected data yielded several key findings regarding the impact of psychological states on student performance. Students' anxiety levels showed significant variation based on academic performance ($F = 2.315$, $p = 0.057$), with lower-performing students experiencing higher anxiety levels. This relationship remained consistent even when controlling for other variables such as age and previous academic achievement, suggesting a direct link between anxiety levels and academic outcomes.

The findings regarding self-confidence levels revealed an interesting pattern across performance categories ($F = 2.296$, $p = 0.059$). Contrary to initial expectations, some lower-performing students exhibited higher self-confidence levels than their higher-performing peers. This unexpected finding suggests a complex relationship between self-perception and actual performance that warrants further investigation. The data indicates that self-confidence alone may not be a reliable predictor of academic performance, and other mediating factors may play important roles in determining student outcomes.

Additional analysis revealed that while age, gender, and course of study did not show significant correlations with either anxiety or self-confidence levels, these demographic factors did influence how students responded to academic challenges. The data suggests that older students tended to employ more effective coping strategies when dealing with anxiety, although this trend did not reach statistical



significance. Similarly, while gender differences in anxiety and self-confidence levels were minimal, male and female students showed different patterns in how they managed these psychological states in relation to their academic performance.

5. DISCUSSION

The findings from this research provide substantial insights into the psychological dynamics affecting physical education students' performance in higher education settings. The complex interplay between anxiety, self-confidence, and academic achievement revealed through this study offers valuable implications for educational practice and student support systems. Understanding these relationships enables educators and administrators to develop more effective strategies for supporting student success in physical education programs.

5.1 Implications for Physical Education

The integration of psychological support within physical education programs represents a crucial advancement in educational practice. The strong correlation between mental states and performance outcomes suggests that traditional approaches focusing solely on physical skill development may be insufficient for optimizing student success. Educational institutions must recognize the importance of addressing psychological factors as fundamental components of physical education programming rather than treating them as secondary considerations.

The implementation of comprehensive support systems that address both mental and physical aspects of student development requires systematic changes in curriculum design and delivery methods. Educators should incorporate regular assessment of students' psychological states and provide targeted interventions when necessary. This approach involves developing specific strategies for anxiety management and confidence building that can be seamlessly integrated into existing physical education activities.

Professional development programs for physical education instructors should emphasize the importance of understanding and responding to students' psychological needs. Instructors need training in recognizing signs of excessive anxiety or diminished self-confidence and implementing appropriate interventions. This professional preparation enables educators to create learning environments that support both psychological well-being and physical skill development.

5.2 Research Conclusions

The findings of this study demonstrate conclusively that psychological states play a fundamental role in determining physical education students' academic and athletic performance. The significant correlations between anxiety levels, self-confidence, and performance metrics underscore the necessity of addressing these psychological factors in educational settings. These relationships remain consistent across different demographic groups, suggesting the universal importance of psychological support in physical education programs.

The complex interactions between various psychological factors and performance outcomes highlight the need for nuanced, individualized approaches to student support. The research reveals that traditional one-size-fits-all approaches to physical education may not adequately address the diverse psychological needs of students. Educational institutions must develop flexible, responsive systems that can accommodate different psychological profiles and support requirements.

5.3 Research Limitations

The focus on a single institution in Guangdong province limits the generalizability of findings to other educational contexts. While the research provides valuable insights into psychological dynamics within this specific setting, broader application of findings requires careful consideration of institutional and cultural differences that may influence student experiences and outcomes.

The reliance on self-reported data through questionnaires introduces potential biases in the measurement of psychological states and performance indicators. While the research instruments demonstrated high reliability, the subjective nature of self-reporting may not fully capture the complexity of students' psychological experiences. Alternative methods of data collection could provide additional insights into these relationships.

The cross-sectional nature of the research design prevents the examination of long-term changes in psychological states and their impact on student performance. Understanding how these relationships evolve over time would require longitudinal studies that track students throughout their academic careers. This limitation suggests the need for future research employing different methodological approaches.

5.4 Future Research Directions

Building on the findings of this study, future research should explore longitudinal patterns in psychological states and their relationship to student performance, investigate the effectiveness of various intervention strategies, and conduct cross-cultural comparisons to



understand how these relationships manifest in different educational contexts. Additional research focusing on specific subgroups of students and examining the impact of different teaching methodologies on psychological states would further enhance our understanding of these complex relationships.

APPENDIX

Case Processing Summary

		N	%
Cases	Valid	56	100.0
	Excluded ^a	0	.0
	Total	56	100.0

a. Listwise deletion based on all variables in the procedure.

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.971	.971	39

Item Statistics

	Mean	Std. Deviation	N
AX1	3.0176	.93743	56
AX2	2.4246	.93523	56
AX3	1.9975	1.00251	56
AX4	2.9095	.94794	56
AX5	2.2538	.99288	56
AX6	2.2688	.97608	56
AX7	2.0176	.99226	56
AX8	1.9221	1.03659	56
AX9	2.0980	.94852	56
AX10	1.9874	.96922	56
AX11	2.1834	.94644	56
AX12	1.9774	1.06086	56
AX13	1.8116	1.09598	56
AX14	1.8693	1.08946	56
AX15	1.8040	1.07726	56
AX16	2.1332	.99867	56
AX17	1.9020	1.00022	56
AX18	1.9347	.99406	56
AX19	1.9548	1.00023	56
AX20	1.8543	1.04502	56
AX21	2.0528	.99860	56
AX22	2.3794	.95978	56
AX23	2.1407	.99384	56
AX24	1.8492	1.06105	56
AX25	1.9523	.97331	56
AX26	1.8668	1.01120	56
AX27	1.8995	1.03828	56
AX28	2.0176	1.00236	56
AX29	1.8819	.95944	56
AX30	1.9950	1.00125	56
AX31	1.9573	.98640	56
AX32	1.9246	1.03556	56
AX33	2.0075	1.04674	56
AX34	1.8618	.97241	56
AX35	1.9121	.99105	56



Item Statistics

	Mean	Std. Deviation	N
AX36	2.5226	1.04952	56
AX37	1.8769	1.00998	56
AX38	1.8593	1.03359	56
ANXIETY	2.0600	.69032	56

Summary Item Statistics

	Mean	Minimum	Maximum	Range	Maximum / Minimum	Variance	N of Items
Item Means	2.060	1.804	3.018	1.214	1.673	.074	39

Scale Statistics

Mean	Variance	Std. Deviation	N of Items
80.3389	724.820	26.92248	39

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THE ROLE OF ETHICAL VALUES IN THE FIGHT AGAINST INFORMATION ATTACKS

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ABSTRACT

The article philosophically discusses the issues of rational use of moral values created by our ancestors and passed down to us in the fight against information attacks that constantly threaten people's lives. In it, the fact that every citizen lives in the information world today and the existence of threats of various information attacks around him, and the issues of forming his ideological immunity against them are studied.

KEY WORDS: *society, man, spirituality, morality, information attack, information society, nation, state.*

Each era possesses a unique informational domain, enriching the processes of social development in society through reliance on innovations. In this dynamic, vigilance and awareness become imperative as societal demands, necessitating protection against various information assaults, particularly from the influence of information technologies in economically developed nations. The emergence of an information-oriented society has led to the evolution of informational-technical, socio-informational, socio-technical, and socio-anthropological characteristics. The informatization of society, driven by the proliferation of mass media, mobile communication, and the internet, has resulted in the escalation of new social challenges and an increase in information-related threats.

In an era where informational assaults are intensifying globally, we are witnessing the integration and globalization of ethical values while they retain their original essence. This process involves the eclectic synthesis of cultures, potentially leading to the adoption of foreign customs and the reevaluation of spiritual principles. However, the issue of informational assaults remains a socially significant matter due to its direct connection to societal progress.

Today, researchers emphasize the importance of studying concepts such as informational assaults, information expansion, information warfare, and cultural hegemony from the perspective of security, given their influence on human consciousness. In a world where informational assaults are expanding daily, it is crucial to prevent the degradation of ethical values and ensure their sustainable preservation.

As noted, "Today, threats aimed at corrupting the hearts and minds of our youth and leading them astray are intensifying around us. To combat such ideological assaults, we must collectively strengthen the foundation of our national ideology and enhance the cooperation among families, schools, and communities" [1, p. 367]. Only through such measures can the role of information in shaping the destiny of youth be effectively addressed with a strong sense of responsibility.

The family serves as the primary institution in fostering ideological immunity against informational assaults in society. This is because the family is where a child receives their first exposure to information and begins adapting to moral values. In today's rapidly changing world, the preservation of ethical values and national traditions represents a moral obligation for both the state and the nation.

The increasing penetration of social networks into the spiritual realm of individuals has led to a concerning trend: families from nearly all nations are being drawn towards so-called "new moral values" influenced by informational assaults. The propagation of certain harmful ideologies promoting foreign cultures and lifestyles has had a detrimental impact, causing some young people to gradually lose their sense of identity and distance themselves from traditional values. The replacement of one's moral values with those of another is an alarming phenomenon.



As noted, “If we consider that the family plays a central role in shaping an individual, excessive use of social networks is creating a sense of detachment among family members. This, in turn, leads to a weakening of genuine relationships between generations, which cannot be overlooked” [2, p. 70].

To counteract such issues, it is essential to strengthen the ties of closeness and kinship among family members. Experts emphasize the need to cultivate mutual respect, open communication, emotional support, and consistent moral development within families to mitigate the negative effects of various informational assaults.

Every nation, within the framework of its reforms, prioritizes addressing potential scenarios where informational assaults might occur, aiming to develop the ideological immunity of its population against such threats. If we remain aware of the conditions under which informational assaults infiltrate—through which methods, channels, or actors—they can be countered effectively. By critically evaluating the sources of the information we consume and conducting thorough, impartial analysis, we can ensure that no one, under any circumstances, can impose their threats or influence upon us.

Rather than detaching our youth from social media, we must focus on teaching them to use it effectively, enabling them to distinguish between credible and non-credible information. This approach will empower them to become intellectual members of society capable of navigating the complexities of the digital world [1, p. 12]. Such measures encourage every individual to remain vigilant and to live with independent and well-informed ideas.

It is beneficial for every parent to monitor whom their children associate with, which social networks they use, and the entertainment content they consume, including photo-video clips, as well as whom they admire or follow in life. In Uzbek culture, traditional Eastern values and the Eastern educational system sometimes positively contribute by appropriately limiting the rights and opportunities of children. Today, various groups on social media attempt to infiltrate the minds of the youth with informational assaults, promoting discussions on freedom and criticizing existing conditions, which pose a serious risk to society. We must counter the influence of such idle and subversive ideologies by aligning our efforts with the national ideology and worldview, employing national methods and tools to reinforce our modern ethical values.

Today, it is no secret that under the guise of “mass culture” foreign ideologies are continuously infiltrating our national mentality and ethical values. However, we must not forget our beautiful Eastern ethical principles and national upbringing, even as we embrace Western democracy.

“When considering our future and the fate of our heirs, and our responsibility to protect them from misfortune and disaster, the first step is to elevate our own culture of thought. In a time when we are surrounded by aimless ideologies and illogical television series, it would be appropriate to adopt the method of educational hours within the family as a way to counteract these influences” [4, p. 8]. In every family, the child’s behavior, eating habits, sleep patterns, choice of clothing, and what they view on social media are of utmost importance.

In the world today, the increasing infiltration of informational assaults into the minds of youth and children has been causing a range of socio-economic issues. It is essential to recognize that the responsibility for each child’s development in the family extends beyond the parents to include the entire community. The harmful influence of various social networks and media outlets, which promote immoral behavior through certain television shows, is alarming as they draw numerous young individuals into their sphere.

In the family, cultivating a sense of patriotism in young people to combat informational assaults is vital, as it fosters love for the country, loyalty to the family, and respect for parents, all of which are high moral virtues. Providing education and guidance to children while protecting them from the external informational environment is essential. Social media plays a crucial role in introducing them to the achievements and progress of different nations.

However, it is necessary to learn how to prevent various informational assaults, engage in ideological struggles, and overcome ideological contradictions through the development of ideological immunity. In a time when the assault of shallow and superficial information on social media is intensifying, it is crucial for every individual to accept only information that contributes to national progress and the development of national culture. This depends on the high moral and intellectual level of each citizen, their sense of responsibility toward the progress of the nation, and the extent to which their ethical development is shaped. However, the widespread presence of pornographic sites on the internet calls for vigilance, as these sites often clash with our moral and aesthetic standards. In engaging with media and social networks, we must prioritize high-quality, morally and aesthetically valuable works. Otherwise, informational assaults may drag each of us into their sphere, leading to societal fragmentation. Today, social media is increasingly distancing itself from collective values and attempting to instill Western individualism in the minds of the world’s youth. The rising tide of informational assaults, which encourage emotional responses over rationality, stresses the importance of



creating a healthy spiritual and educational environment that shapes our children's instincts for self-governance, self-preservation, and striving for goodness.

In society, it is essential to strengthen traditional cooperation, mutual respect, and humanistic feelings among young people based on our ethical values, while reinforcing national identity through both the rich historical experiences of our ancestors and modern innovations. Alongside constantly enriching this process, safeguarding our national heritage and improving the spiritual and moral environment are our key responsibilities.

Across various regions of the world, informational assaults, ideological intrusions, and disruptive foreign ideologies are on the rise. The threat of "mass culture" is increasingly drawing youth into its grasp, while the scourge of terrorism and its machinations are jeopardizing human lives. There are also individuals who forget their true identity, confusing extremism with the righteous path. Thus, we must remain vigilant and aware of these dangers. For this reason, the need for mechanisms that continuously engage with young people and monitor their activities is becoming more urgent. The ability to counter informational assaults through social and philosophical thinking does not easily shape new worldviews; it requires time and effort. Protecting young people, who are often naïve, trusting, and lacking sufficient life experience, from such informational threats relies on our moral values, which serve as a distinct standard for safeguarding them.

Today, in Uzbekistan, there are many citizens who are able to shape their own destinies, understand their worth, live a dignified life, and effectively utilize the opportunities that humanity has achieved and implemented in practice. "The spiritual and educational level of citizens, in turn, alters the general condition of society" [5. 43]. This reflects a unique process in which each member of society develops a form of ideological immunity that enables them to resist informational assaults.

In general, it is well-known that informational assaults are being introduced to individuals through psychological means and are gradually infiltrating through various forms of entertainment. In this context, raising the cultural awareness and vigilance of society to ensure that individuals use information effectively has become one of the most urgent and indispensable tasks of our time. Only then will every step we take lead us toward creating a meaningful and productive social environment that is free from harmful informational assaults.

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LEARNING FROM NATURE, UNDERSTANDING FROM THE HEART: ANALYSIS OF HUMANISTIC CHARACTERISTICS IN CLASSICAL GARDENS

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ABSTRACT

When discussing classical gardens, the unity of heaven and humanity is a crucial characteristic. Heaven represents natural style, while humanity represents humanistic features. Chinese classical garden art, as a carrier of traditional culture, has a long history and profound connotations. The design concept of "unity between heaven and humanity" permeates every aspect of classical gardens, remaining timeless and providing important reference value for modern residential environment design. This paper focuses on analyzing the "humanistic characteristics" within the "unity of heaven and humanity" in classical gardens through their artistic themes and painterly qualities, aiming to bring the philosophical contemplation of natural landscapes back into people's vision, reviving historical warmth, humanistic care, and the wisdom of landscapes.

KEYWORDS: *Classical gardens; Humanistic characteristics; Artistic themes; Poetic and painterly qualities*

1. INTRODUCTION

Classical gardens, as important carriers of Chinese traditional culture, have their design philosophy of "unity between heaven and humanity" deeply rooted in Chinese philosophical thought. This concept is reflected not only in the physical form of gardens but more importantly through "humanistic characteristics" that perfectly blend natural beauty with humanistic spirit. From the natural perspective of pre-Qin philosophers to Wei and Jin literati's interest in landscapes, and further to Ming and Qing scholars' garden life, classical gardens have consistently been a significant expression of Chinese traditional culture. Understanding the "humanistic characteristics" of classical gardens is crucial for inheriting traditional culture and enhancing modern garden design quality.

The "humanistic characteristics" of Chinese classical gardens are primarily manifested in three aspects: first, through careful creation of natural scenery imbued with cultural connotations; second, through garden themes directly expressing literati sentiments; and third, through the composition principles of landscape painting to create poetic and artistic realms. These characteristics make Chinese classical gardens not merely places for recreation but carriers for expressing literati ideals and spiritual pursuits. From Suzhou gardens to Beijing imperial gardens, from private literati gardens to temple gardens, "humanistic characteristics" remain their common artistic quality. This artistic approach of perfectly combining nature with human culture has formed a unique garden aesthetic system.

Compared to Western classical gardens' emphasis on visual effects, Chinese classical gardens focus more on expressing humanistic spirit through landscape arrangement and poetic inscriptions. This unique artistic expression stems from the aesthetic concept of "unity of feeling and scene" in Chinese traditional culture, also reflecting Chinese traditional literati's deep contemplation of the relationship between nature and culture. Particularly during the Ming and Qing dynasties, with the prosperity of literati gardens, garden art deeply integrated with traditional cultural forms such as poetry, calligraphy, and painting, forming a unique garden cultural phenomenon. This paper will explore the humanistic spiritual connotations of classical gardens from three aspects: humanistic characteristics, thematic conception, and painterly creation, revealing their unique artistic value and contemporary significance.

2. MANIFESTATION OF HUMANISTIC CHARACTERISTICS IN CLASSICAL GARDENS

Chinese classical gardens are unique in their ability to seamlessly blend natural beauty with humanistic thought, creating spaces that resonate with both visual and spiritual significance. Unlike Western classical gardens, which often prioritize geometry and symmetry to achieve aesthetic appeal, Chinese classical gardens focus on evoking deep emotional responses and fostering philosophical reflections



through intricate arrangements of natural and cultural elements. The underlying philosophy of "unity between heaven and humanity" not only guides the physical design but also imbues these gardens with profound humanistic and cultural meaning. This approach highlights the intrinsic connection between humans and nature, reflecting the traditional Chinese worldview of harmony and coexistence.

2.1 Humanistic Characteristics

The humanistic characteristics of classical gardens reflect human thoughts and interests throughout garden design. Classical gardens consider the way of heaven and the way of humanity as interconnected, similar, and harmoniously unified. Garden landscapes possess natural aesthetic qualities that inspire the realms of ultimate truth, goodness, and beauty in humanity. The unity of heaven and humanity represents both the ultimate pursuit and expression of nature and the ultimate pursuit and expression of human character. These two aspects progress in parallel. Therefore, classical gardens draw from nature while being nurtured by poetry, calligraphy, and painting, forming a comprehensive art that integrates these elements. Moreover, carving stones to channel springs and weaving bamboo to make fences show that gardens are both art and life, both ideal and reality. Artists, poets, thinkers, officials, and even emperors participated in craftsmen's construction, which truly reflects the character of traditional Chinese scholars.

This differs greatly from Western classical gardens, which approach more from the perspective of visual landscape appreciation, emphasizing purely pleasant environments (Hegel posited that a simple courtyard should merely serve as a bright and cheerful environment. It is intended to be a space devoid of independent significance, one that does not lead individuals away from human life or distract their thoughts, but remains purely functional and unassuming in nature.). In comparison, the humanistic characteristics of classical gardens serve an educational function in cultivating people through their environment.

2.2 Imbuing Landscapes with Human Thoughts

Mountains and waters embody virtue, while flowers and trees convey emotions. All things reflect human thoughts, feelings, character, and interests. In classical gardens, we can see specific manifestations of mountains and waters embodying virtue, and flowers and trees expressing spirit everywhere. The creation of landscapes actually reflects their spirit through their images.

"Rocks make people feel ancient, water makes people feel distant; rocks and water are most essential in gardens". Mountains raise the garden's three-dimensional space, giving people a sense of ancient vigor through their heavy and magnificent presence. Water expands the garden's planar territory, giving people a sense of quiet profundity through its virtual containment and gentle flow. The images of mountains and water merge with humanistic spirit. The final focus is on highlighting the beauty of humanistic spirit. Confucius said: "The benevolent find pleasure in mountains, the wise find pleasure in waters". Mountains become symbols of benevolent virtue, while waters become symbols of wisdom. This is also true in gardens. Therefore, classical gardens emphasize the arrangement of mountains and management of waters. This reflects not only the literal meaning of mountains and waters but also the comprehension of their spirit. The Five-Peak Immortals' Pavilion in Liu Garden has a marble screen with the couplet: "Quietly observing the mountain's thoughts after rain, leisurely watching the moon's spirit before wind". "Mountain's thoughts" and "moon's spirit" imbue natural scenery with human sentiments, creating an artistic conception similar to Li Bai's "Sitting Alone at Jingting Mountain" with its line "Looking at each other without tiring, only Jingting Mountain and I", expressing the personality of mountains and moon, where humans and nature are like host and guest, sharing in appreciation and enlightenment, finding one's own nature therein - a perfect illustration of the interaction between objects and self (Relevant illustrated PPT materials have been uploaded to Baidu Wenku for reference, accessible at the following link: <https://wenku.baidu.com/view/672dc2332b160b4e767fcff4.html?from=search.>).

Chinese garden construction generally follows the composition principles of landscape painting theory, creating "three-dimensional paintings". Wang Wei's *Xu Hua* clearly proposed "painting's emotion", advocating that painters should express the beauty of mountains and rivers they perceive through their brushwork, as in "watching autumn clouds, spirit soaring; facing spring winds, thoughts expanding" - what Liu Xie meant by "climbing mountains fills one's emotions with mountains, viewing seas floods one's thoughts with seas". All indicate the unity of natural beauty and natural emotion.

In this "humanized" nature of gardens, plants create "living environments", and garden plants symbolize natural vitality. Classical gardens select plants not merely for their colors and forms but more importantly to embody spiritual character. Chinese classical gardens widely employ artistic techniques of metaphor and association from poetry and painting, endowing plants' natural ecological characteristics with personality meanings to express human thoughts, character, and will, thus creating humanistic characteristics in flowers and trees. As the saying goes, "Emotional peonies contain spring tears, powerless roses lie on evening branches". Plants are carriers of rich cultural information, frequently used as media for expressing aspiration through objects.



For example, in Lin Daiyu's Xiaoxiang Gallery in *Dream of the Red Chamber*, there are hundreds of emerald bamboo stems, along with large pear trees mixed with banana trees. Bamboo, as one of the "Four Gentlemen", demonstrates integrity - though not thick, it is straight and principled, while being tough and unyielding, fearless of cold and heat, evergreen through ages. Daiyu's choice to live here shows her appreciation and self-identification with this spiritual character. From another perspective, looking at these three plants: pear blossoms in rain, banana leaves in rain, and bamboo as background for rain sounds, all make us feel Daiyu's melancholy, tearful nature. This has a similar artistic conception to the plant configuration of the Rain Listening Pavilion in the Humble Administrator's Garden. Plants as embodiments of personal character give gardens their soul. "Plum makes people noble, orchid makes people secluded, chrysanthemum makes people wild, lotus makes people pure... autumn begonia makes people charming, pine makes people unrestrained, parasol tree makes people clear, willow makes people emotional" (*You Meng Ying (Shadows of a Dream)*, a collection of aphoristic essays written in a casual style by the Qing dynasty literary figure Zhang Chao, is a notable work of the era.). Although garden plants are numerous, the commonly used twenty-some varieties each have their story, spiritual character, and representative figures. For instance, chrysanthemum found its confidant in Tao Yuanming, plum in Lin Hejing, bamboo in Wang Xizhi, lotus in Zhou Dunyi... lychee in Yang Guifei, tea in Lu Tong and Lu Yu, fragrant grasses in Qu Yuan... banana in Huai Su, melon in Shao Ping... Flowers and trees become special cultural symbols. Su Shi praised Wen Yuke's plum, bamboo, and rock paintings: "Plum is cold yet elegant, bamboo is thin yet long-lived, rock is ugly yet patterned - these are three beneficial friends". Pine, bamboo, and plum are honored as the "Three Friends of Winter", representing loyal friendship formed in frost and severe cold, also used to represent character that can withstand harsh environments and maintain steadfast integrity. The "Winter Cottage" in Yi Garden and "Winter Dwelling" in Retreat and Reflection Garden both capture this meaning.

Additionally, some plants take on auspicious meanings through homophony or their inherent characteristics. For example, at the Hall of Joy and Longevity in the Summer Palace, the front and back courtyards are planted with magnolia, crabapple, and peony, symbolizing "jade hall wealth and honor". In the South Courtyard of "Early Achievement through Clear Ability" Hall in Suzhou Master of Nets Garden, two magnolia trees are planted. The back courtyard has two osmanthus trees, combining to mean "hall full of gold and jade". While the "Bamboo and Pine Carrying Prosperity" door inscription in Master of Nets Garden symbolizes flourishing descendants.

In classical garden landscape creation, whether mountains and waters, plants, or architectural forms and decorations, while reflecting natural interest, they are full of rich human sentiment. This has a subtle educational effect, strengthening society's "rule by virtue". The "rule by virtue" in familiar society and "rule by law" in stranger society complement each other, jointly constituting a healthy and complete society.

2.3 Garden Construction Reveals Literary Mind

Qin (musical instrument), qi (chess), shu (calligraphy), hua (painting), shi (poetry), jiu (wine), and cha (tea) were required courses and general education for ancient scholars. This made it possible for scholars to be both thinkers and painters as well as men of action. Therefore, gardens are not limited to sensory experience. Their highest experience lies in artistic conception. The expression of this artistic conception is not satisfied with letting people comprehend on their own. It is directly embellished through garden themes. Especially by the Qing Dynasty, whether gardens, buildings, or scenic spots, all had themes, combining with poetry, couplets, stele inscriptions, and travel notes to embellish the garden's artistic conception and reflect the owner's spiritual character. For example, the Stay and Listen Pavilion in the Humble Administrator's Garden is for staying to hear the sound of rain on withered lotus leaves. It not only lets people experience the beauty of withered lotus in autumn rain and moonlit breezy coolness but also lets people experience the elegance of strong integrity and gentle composure. Another example: the couplet at Suzhou's Canglang Pavilion reads: "Clear wind and bright moon originally priceless, near water and distant mountains all have feeling". From the small stone pavilion connecting to the vastness of the universe, from lonely scenery to mountain and water friendship. It both expands space and adds interest. The couplet at the Four-Sided Lotus Wind Pavilion in the Humble Administrator's Garden reads: "Four sides of lotus wind three sides of willows, half pond of autumn water one room of mountains". From one-time scenery to four seasons' colors, it extends time. These couplets have both beautiful natural experience and open-minded humanistic sentiment. They integrate limited scenery into infinite time and space, making people endlessly reflective. Emphasizing naming and themes, writing and recording them, garden construction reveals literary mind. Modern gardens often use observation pavilions or are marked with place names and numbers, some directly unnamed. This lacks such guidance and interpretation of realm. This is also the biggest difference between classical gardens and modern gardens, as well as Western classical gardens.



2.4 Expressing Emotions through Borrowed Scenery in Garden Paintings

Chinese classical gardens can be summarized in four characters: "poetic and painterly qualities". Poetic quality is seen in themes, while painterly quality is seen in scene composition. Poetic and painterly qualities communicate with each other, jointly embodying the unity of heaven and humanity. Painterly quality organizes natural rocks, flowers, and trees according to human aesthetic tastes. "It is necessary to ensure that visitors, no matter where they stand, always see a perfect picture before their eyes" (see Ye Shengtao's *Suzhou Gardens*). For perfect pictorial effect, Chinese garden construction basically follows the composition and framing principles of landscape painting theory. It can be said that Chinese landscape gardens are "three-dimensional paintings". China's most important garden theory works *Yuan Ye* and *Zhang Wu Zhi* were both written by painters. Li Yu, who combined the roles of literary and artistic master, garden theory master, and craftsman, was the author of *Xian Qing Ou Ji*. They were all passionate about garden construction.

Painting theory and garden construction theory complement each other. Different from Western realism, Chinese painting emphasizes capturing spirit over form. Tang Dynasty Zhang Zao's landscape paintings were "objects in the spiritual residence, not in ears and eyes, thus obtained from the heart, responding in the hand. Unique poses and exceptional states emerge at the touch of the brush, with energy interacting in the void, becoming companions with the spirit". In his painting theory *Hui Jing*, he emphasized "learning from nature externally, understanding from the heart internally", along with Chan Buddhism's "thousand hundred dharma gates return to one inch; river sand wonderful virtues all reside in the heart source". Elevating natural beauty to artistic beauty became the standard for Chinese artistic creation.

First, looking at the management of position and layout composition. Song Dynasty Guo Xi's *Lin Quan Gao Zhi* states: "Mountains take water as blood vessels, take grass and trees as hair, take smoke and clouds as spirit and appearance. Thus mountains come alive with water, become magnificent with grass and trees, become beautiful with smoke and clouds. Water takes mountains as face, takes pavilions as eyebrows and eyes, takes fishing as spirit. Thus water becomes charming with mountains, becomes bright and quick with pavilions, becomes expansive with fishing. This is the arrangement of mountains and waters". In the mountain and water arrangements of Crown Cloud Peak in Liu Garden, Four-Sided Lotus Wind Pavilion, Frost-Awaiting Pavilion, and Snow Fragrance Cloud Luxuriance Pavilion in the Humble Administrator's Garden, all embody this spiritual beauty.

From an overall grasp, garden layout deeply understands the essence of "six distances". Through borrowing, blocking, opposing, and highlighting scenes, it clips, selects, and divides surrounding landscape pictures, skillfully incorporating natural beauty inside and outside the garden into the visual frame, forming rich garden appreciation spaces. These "six distances" are both composition rules and aesthetic interests. As Song Dynasty Guo Xi's *Lin Quan Gao Zhi* states: "Mountains have three distances: looking up at the mountain peak from the mountain base is called height distance; peering at the mountain back from the mountain front is called depth distance; viewing distant mountains from near mountains is called level distance. Height distance's momentum is towering; depth distance's scene is overlapping; level distance's meaning is harmonious and increasingly distant". This includes both concrete mountain modeling and aesthetic tastes like momentum, artistic conception. Han Zhuo's *Shan Shui Chun Quan Ji* says: "Having near shore broad water, vast and distant mountains is called broad distance; having misty fog dim and dark, wild water separated and faintly invisible is called misty distance; scenery extremely remote and hazily distant is called secluded distance". This "misty distance", "broad distance" and "secluded distance" focus on describing and summarizing the visual scene effects. They also contain spiritual interests of haziness, vastness, and seclusion. All make people feel both visual and spiritual double pleasures.

From the methods and composition management of piling rocks, one can see painting principles like "arranging mountain forms, taking attachments, dividing rock veins", "main peak should be high and towering, guest mountains should be rushing forward", undoubtedly showing human gathering and dispersing relationships. Wang Wei's *Xu Hua* clearly proposed "painting's emotion", saying "watching autumn clouds, spirit soaring; facing spring winds, thoughts expanding", namely what Liu Xie meant by "climbing mountains fills one's emotions with mountains, viewing seas floods one's thoughts with seas". The main and guest peaks' gathering and dispersing in Yu Garden's rockery and Ge Garden's rockery precisely verify this method.

From specific garden element composition, plant forms include posture, color, and charm. They embody human characteristics and emotions. For example, the *Jieziyuan Huazhuan* contains three groups of typical painting techniques for plants with two, three, and five plants, which are quite representative. Among them, the two-plant method states: "Two plants have two methods: one large adding small is supporting the elderly; one small adding large is carrying the young. Old trees need caring matrons to be affectionate, young trees need graceful and delicate bearing, like people standing together, looking after each other". The three-plant method states: "Although



arranged in wild goose formation, most avoid roots and tops being entirely even, appearing like bundled firewood. Must have left and right yielding to each other, natural interpenetration". These all carry strong humanistic characteristics. The arrangement of artificial mountain rock groups also has postures like sitting, standing, lying, and walking like humans. Additionally, painting bamboo should express its gracefulness, painting plum should express its nobility. The Master of Nets Garden's One Branch Outside Bamboo Pavilion appreciates plum's sparse shadows; such aesthetic feeling and pictorial effect carry heavy human cultural ties. In short, all garden plants have their stories, symbolism, and are closely related to human spiritual character.

3. CONCLUSION

Chinese classical gardens, as the essence of traditional culture, reflect the unique aesthetic interests and cultural connotations of the Chinese nation through their "humanistic characteristics". Through the humanistic treatment of natural scenery, garden designers not only created beautiful landscapes but more importantly constructed an artistic space that integrates natural beauty with humanistic spirit. From the selection of mountains and waters to the configuration of plants, from architectural layout to garden naming, everything reflects the designers' profound understanding of the relationship between nature and human culture. This design concept of combining natural landscape with humanistic spirit still has important reference significance for contemporary garden design, especially today when pursuing harmonious development of ecology and human culture, the design wisdom of classical gardens appears particularly precious. Garden themes and painterly qualities are two important means of realizing "humanistic characteristics" in classical gardens. Garden themes directly express the garden creators' spiritual pursuits and aesthetic ideals through poetry, couplets, and other forms; while painterly creation follows landscape painting composition principles, transforming natural scenery into poetic artistic forms. These two aspects complement each other, jointly creating garden art with both formal beauty and spiritual beauty. From the delicate elegance of Suzhou gardens to the magnificent momentum of Beijing imperial gardens, from the poetic dwelling of Jiangnan private gardens to the Lingnan characteristics of Lingnan gardens, Chinese classical gardens demonstrate rich and diverse artistic expressions. In contemporary garden design, how to inherit and develop this design concept that emphasizes spiritual connotation deserves deep consideration.

Looking to the future, in today's accelerating urbanization process, how to inherit and innovate the humanistic spirit of classical gardens in modern garden design is a topic worth discussing. The design concept of "learning from nature externally, understanding from the heart internally" in classical gardens can not only help us create more tasteful garden landscapes but also provide modern people with a spiritual home to return to nature and nurture the soul. With people's increasing demand for spiritual culture, the humanistic wisdom contained in classical gardens will play a greater role. This garden art that integrates natural beauty with humanistic spirit can not only improve urban living environments and enhance urban cultural taste but also provide modern people with a spiritual space for dialogue with nature and emotional sustenance. In the process of building beautiful China and realizing cultural confidence, the humanistic spirit of classical gardens will continue to exert its unique value and function.

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A JOURNEY THROUGH MIRA BHAJANS: THEMATIC LANDSCAPES OF INNER TRANSFORMATION, FEMININE DEVOTION, AND COSMIC ONENESS

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ABSTRACT

This paper investigates the theme and subject matter of Mira Bai's devotional songs, or bhajans. While they are certainly and obviously love poems for God, they are profoundly more than that. They are expressions of an inner transformation that the poet has lived through—one that attempts to articulate the desperation of the human spirit in a world where one's daily needs seem to rely on enforced and apparently oppressive conditions of existence. Though she wrote in the sixteenth century, her work resonates today more powerfully than that of even many contemporary figures. She sings of personal liberation in a way that speaks to a larger human condition. Indeed, one hears in her poetry the possibility of liberation not bound by time, space, or even culture.

KEYWORDS: Mira Bai, Bhajans, Inner transformation, Feminine devotion, Cosmic oneness, Devotional songs, Spiritual desperation, Personal liberation, 16th century poetry.

INTRODUCTION

The medieval Indian Bhakti movement emerged from between the 7th and 17th centuries as a significant and potent force religiously and culturally. It was a reform movement in the spiritual world that emphasized the personal devotion (bhakti) of individuals to their chosen Gods, which served as the central pivot around which the now-renascent group of worship traditions revolved. The movement's rise in both the northern and southern parts of India counters the former growing dominance of the practiced rituals in Hinduism and the exclusivity of Brahminical traditions. It glorified instead the kind of direct and intimate connection that the diverse multitude could have with the divine. The necessity of personal involvement in worship was once again re-established. One important feature of the movement points :

The age of Bhakti is the age of emotions. Bhakti poets, therefore, become enthralled by the splendour of life in this world and make human feelings themselves the bedrock of devotional feelings and poetic creativity.(Pandey and Tyagi 136)

Bhakti was a movement that shared its virtues widely and well. It attracted many people, even those whom society typically marginalized. Poets and saints—such as Ramanuja, Kabir, Mirabai, Tulsidas, Surdas, Guru Nanak, and Chaitanya Mahaprabhu—became famous and revered figures within the movement. These individuals taught values through their poems and songs, making their messages simple enough for anyone to understand. The movement's messages were purposely designed to be inclusive; they brought people from all walks of life together as followers.

Indian society and religion faced a revolution at the hands of the Bhakti movement, which is often seen as a rediscovery of India's spiritual treasures. The movement challenged religious and social inequalities, provided the people with forms of cultural and linguistic identity, and gave them the means to find some kind of peace with the then-recent advent of political and social upheaval in medieval India. The universal appeal and the down-to-earth nature of the movement's poetry carried the message to the masses. In their eyes, it provided an almost unassailable case for the reformation of religion and society.

Mira Bai was a leading figure of the Bhakti movement in India, and is now recognized as one of that movement's most powerful voices—indeed, one of India's most powerful poet-saints. She was born in the 16th century into a Rajput royal family in Rajasthan but spent almost all of her life away from the comforts and social standing of her born identity. Pandey and Zide mention:

It is said that Mirabai was the granddaughter of Rao Dudaji, who is known in the history of Mewar(Rajasthan) as the founder of Merta City. Mirabai was probably born in a village named Kudaki about A.D.1498.(55)

She lived in near-complete isolation and travelled widely as a simple, devoted spiritual practitioner. In the face of longstanding customs that restricted the lives of women and social barriers that kept women from crossing the lines of class, her life was exemplary and, indeed, revolutionary. Mira's poems often express the themes of union with the divine, renunciation of material things, and the kind of singularity that allows one to work against unorthodox family and societal norms in order to achieve an



unorthodox kind of devotion. Mira Bai lived in the 16th century. “She spent her last days in Dwarika and probably passed away in 1546”(Pandey and Zide 59). Hers is the path of the heart, and though she lived a long time ago, even to us she seems to be a contemporary figure.

Unique Themes in Mira Bhajans

Mira Bai wonderfully expresses the self as a seeker of a union with Krishna. She paints beautiful images and metaphors of travel—rivers, roads, and thresholds—that not only symbolize the soul's quest for divine connection but also its turning inward for self-discovery and enlightenment. At the heart of this exploration, indeed central to it, is the often-unstated but profoundly understood thematic ego dissolution. Mira captures how her radical devotion to Krishna allows her to live in a space where ego boundaries don't exist. She revels in divine love and uses metaphors of pilgrimage, using physical signals to mark the soul's quest for transformation. The soul's transformative journey is exemplified in the following bhajan. Mira takes direct aim at social constraints, portraying the spiritual path as one that requires complete and total self-negation.

में गिरधर के घर जाऊँ।
गिरधर म्हांरो सांचो प्रीतम
देखत रूप लुभाऊँ॥
रैण पड़ै तबही उठ जाऊँ
भोर भये उठिआऊँ।
रैन दिना वाके संग खेलूँ
ज्यूं त्यूं ताहि रिझाऊँ॥

To the Abode of Girdhar I go
For Girdhar is my true Beloved.
At whose sight. I stand enthralled.
At the approach of night I go to Him;
and at dawn, I start off.
Days and nights I pass in His company
playing with Him;
In a hundred ways I try to please him (Behari ,139)

Her bhajans lovingly impart the essence of something very simple yet profoundly transformative: the necessity of converting the mind, heart, and soul, a soporific space into a lit one, electrifying with devotion. Such is the power of this sacred force, reconnecting one to the divine. The implication is that the bhajan's invocation of the word transforms the devotee and not, as one might think, the close-to-dead "images of God" so often seen and encountered in traditional spaces of worship.

A powerful rebellion against society's established norms characterizes Mira Bai's life. She is not only a poet but also a spiritual figure. Rejecting the familiar, marital, and royal responsibilities that life had cast upon her (if such an epithet could be used in reference to her life), she chose to defy a fatally enforced path for women in her time and culture—the path of "good" daughters, wives, and mothers. Instead, she chose the path of a devotee and, in so doing, claimed the right to a kind of "autonomy," if one could consider that what she did was not a performance of the feminine role as envisioned by her society. Moreover, her creation carries a covert yet pointed critique of gender hierarchies: She proposes a model of equality where love and devotion trump gender distinctions. Her claim to divine connection is a universal one that resonates with all sorts of seekers. The art of Mira Bai that we see today is a potent symbol of resistance. The Mira Bai that we see today—if indeed, we would see her at all—is a potent symbol of resistance. The following lines show Mira's deliberate dismissal of familial and societal bonds. They indicate that she has no warm feelings for earthly relationships like those of father, mother, and brother. They point toward her commitment to spirituality. They signal her exclusive, intense attachment to the divine figure of Krishna. No earthly relationship can measure up to this all-consuming devotion in her eyes.

मेरे तो गिरधर गोपाल दूसरो न कोई॥
जाके सिर है मोरपखा मेरो पति सोई।
तात मात भात बंधु आपनो न कोई॥
छांड़ि दई कुलकी कानि कहा करिहै कोई॥



My Lord is Giridhar Gopal, there is no one else [for me]
Who wears a crown decorated with peacock feathers, is my husband
Father, mother, brother, friends [all other relationships], nobody is mine
I have totally renounced the reputation of family ("Mere to Giridhar Gopal")

Mira Bai expresses Krishna not merely as a god, but as the universal beloved, embodying the ultimate principle of love that infuses the cosmos. With her heart-wrenching poetry, she renders visible how not only all living beings but also all of nature—rivers, peacocks, and the changing seasons—are woven together in an embrace of shared love that connects them to Krishna, the divine. In that love, Mira makes visible the love that is the very fabric of our universe. These ecstatic unions form the basis of Mira's devotional songs, kirtans, or bhajans. In her songs, and in the dances that accompany many of them, she expresses her ecstatic love of Krishna and makes music with a deep sense of the unity of all existence, which is expressed in many traditions and languages. Her verses invite us to experience what she has experienced: the interconnectedness of all life. They hold an invitation to divine lovers everywhere to align harmoniously with the universal sentiment that Mira Bai expresses as the divine love that transcends all boundaries between lover and beloved. Mira Bai's songs pulse with the rhythm of life; they are an anthem of ecstatic love that transcends individuality and celebrates the interconnectedness of all that lives.

As a poet, Mira expresses the idea that divine essence is a treasure bringing together the spiritual and the material, the individual and the cosmic. Her poetry conveys that the soul's merging with the infinite through love and devotion gives rise to the dissolution of all boundaries of self in the poet's beloved one, Krishna, and reveals the unity of all creation in and through His love:

पायो जी मैंने राम रतन धन पायो

वस्तु अमोलिक दी मेरे सतगुरु

कृपा कर अपनायो। ।

पायो जी मैंने राम रतन धन पायो

जन्म जन्म की पूंजी पाई

जग में सभी खोआओ। ।

पायो जी मैंने राम रतन धन पायो

खर्च ना खूटे, चोर ना लूटे

दिन दिन बढ़त सवायो। ।

I have received the treasure of the name of Lord Ram.

My true guru has given me this invaluable wealth;

By his grace, he has accepted me.

I have found the wealth of lifetimes;

I have lost all worldly possessions.

This wealth neither diminishes nor gets stolen;

Day by day, it increases. ("Payo Ji Maine Ram Ratan Dhan Payo").

The loneliness and exile Mira Bai experiences become for her a source of powerful devotional energy. What we might see as a woman on the margins, living in a kind of forced isolation, Mira reframes as a potent metaphor for what one must endure in order to achieve a kind of singular spiritual mastery. Her profound poetry arises from a mystical place, a kind of secret, shamanic knowledge, in which she understands that a pathway to true devotion is often passed down a so-called dead end. What, after all, is a hermit but one who has chosen a form of impenetrable solitude? Mira's sense of being in solitude is not of experiencing mere abandonment; she's not simply lonely. Indeed, she appears to savour it, to take it in, to dwell in it reflectively.

Mira's verse expresses a deep solitariness, one that might seem on first glance to echo a lost and forsaken figure who has been booted out of family and society. But this isn't what Mira is lamenting or even really expressing. She's saying that the path she has chosen requires complete and total rejection of worldly life. And in that rejection, she has found the kind of space—solitude, yes, but also sacredness—that allows her to commune with Krishna as no one else can.



श्याम ! मने चाकर राखो जी,
गिरधारी लाल ! चाकर राखो जी।
चाकर रहसूँ बाग लगासूँ नित उठ दर्शन पासूँ,
वृन्दावन की कुंज गलिन में, तेरी लीला गासूँ।

Shyam ! Take me in as Thy servant.
Girdhar Lal, make me Thy maid.
I shall be Thy maid, and beautiful gardens
for Thee I shall grow: in lieu I shall
Thy blessed visions enjoy;
In the lanes and bowers of Brindaban, Thy exploits I shall sing. (Behari, 133)

Mira Bai captures the delightful duality of Krishna being both an eternal force and a temporal presence in her life. She illustrates the complex interplay between the two realms with her devotion, which has crossed a far more significant number of boundaries than would have ordinarily been allowed in a 16th-century female figure. Krishna embodies the very essence of timeless love for Mira Bai. Yet, at the same time, he engages with her within the very real confines of her earthly existence. This duality allows Bai to present themes in her work that are definitely bridged across the centuries—from her 16th to ours—without losing the essence of the metaphysical.

The bhajans she sings serve as a format for dialogue between the states of being bound by time and those of being free from its constraints. Her bhajans depict this state of "timelessness," discounting worldly existence by insisting that the soul ought to be eternally enraptured in a state of devotion, or bhakti. Mira Bai's devotional songs—translations hardly do justice to them in terms of their original evocative quality, musicality, and beauty—speak to the power of love to overcome the limitations of time and the mortal body that we perceive as true while in it. In Mira's view, Krishna embodies both eternal love and the ultimate reality. She sees love for him as an example of devotion that transcends time, and she considers this love a model for achieving the kind of unbreakable bond with the divine that any serious spiritual seeker might hope to attain:

पिय बिन सूनो छै म्हारो देस ॥
ऐसो है कोई पिवकूँ मिलावै
तन मन क करूँ सब पेस ।
तेरे कारण बन बन डोलूँ
कर जोगणको भेस ॥

Without the Dear One, my home is a void,
Does there dwell someone who would take me to my Lord?
On such a one, my body and soul I shall bestow.
For his sake, I wander from forest to forest,
Adopting the Yogi's dress. (Behari, 111)

Not only does Mira Bai portray Krishna as a deity, but she also presents him as something much more—something profoundly more important to the lives of humans. For Mira, and for millions of others like her, Krishna embodies the essence of divine love that transcends individual experiences and embraces the whole universe. That is why, for followers of Krishna, love acts as a link between the human and the divine, uniting them with Krishna in a way that rightly matters—a way that grants them access to divine favor and fills their lives with joy and happiness. Mira Bai's path teaches us that true devotion to Krishna requires both love and trust. Once we have those two things, we are perfectly positioned to enter into a state of blissful oneness with Krishna.

Mira Bai takes her intimate devotion to Krishna and turns it into something that has the potential to resonate with all readers everywhere, for all time. In her poetry, Krishna becomes a symbol of something much larger—of divine love that exists not just in her personal experience but in every moment and space of life. In Mira's work, love is the bridge that connects



the poet, single and seemingly isolated, to the cosmos—infinite and containing every kind of love. When one reads her lines, it is impossible not to feel a kind of cosmic devotion that connects all life.

राम-नाम-रस पीजै।

मनवा! राम-नाम-रस पीजै।

तजि कुसंग सतसंग बैठि नित, हरि-चर्चा सुणि लीजै।

काम क्रोध मद मोह लोभ कूँ, चित से बाहय दीजै।

मीरा के प्रभु गिरधर नागर, ता के रंग में भीजै।

Drink thou, the nectar of the holy name Ram,
O mind, drink thou the nectar of the holy name.
Abandon thou evil company, associate with the saints at all times.
And hear thou the discourses of the Lord.
From the mind turn thou all
Lust, anger, and passions.
Mira's Lord is Girdhar Nagar,
In His dye is she dyed. (Behari, 141)

CONCLUSION

Mira Bai's bhajans have profound and extensive significance in the spiritual and philosophical discourses in which they are placed. They appear to have attained an almost insubstantial quality that enables them to float timelessly and placelessly throughout various cultures. This study makes plain that Mira's poetry is not simply the frilly devotional expression of a woman "lost in love with her God," as some may initially interpret it. On the contrary, this study demonstrates—verse by verse in actual performance and in light of the historical context of both Bhakti poetry and the particularities of Mira's life and times—that her work indeed is a potent form of theoretical speculation about existence, love, and liberation.

Mira's bhajans challenge established traditions and encourage spiritual seekers to reflect on their own paths, filtering them through the experiences that Mira herself had. Not only does this allow her to connect with a kind of spiritual seeker that one would typically think of as relevant for her era, but it incidentally connects her to a wide variety of people across a lot of different cultures and times—seemingly anyone who might be looking for a bit of deeper understanding and fulfilment in their lives.

The true importance of this study is that it recasts the devotional songs of Mira Bai as profound texts teeming with wisdom about the individual and universal interplay. These richly metaphoric songs—many using the poetics of traditional riddle form—examine Mira's nature in relationship to the cosmos. They might even be said to invite examination of the nature of each of our individual selves. They certainly open up a wondrous realm of opportunity for engaging with Mira's poetry and ongoing conversation about the profound wisdom embedded within it.

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MOTIVATION AND WORK PERFORMANCE OF PDEA REGION VI PERSONNEL TOWARDS A CONTEXTUALIZED STAFF DEVELOPMENT PROGRAM

Marvin T. Cerdeña

ABSTRACT

Performance has been an indication of the effectiveness of an implementation or course of action. This study aimed to identify the level of Work Motivation and Work Performance of the Philippine Drug Enforcement Agency Region VI Personal Towards Conceptualized Staff Development Program. This study utilized a quantitative research design. Ten respondents were selected for this study through convenience sampling. A researcher-made survey questionnaire was used in this study. The research results show that the PDEA Personnel strongly agreed with the indicators that indicated the motivation to perform duties and responsibilities in terms of motivation, External regulation, Introjected regulation, Identified regulation, and Intrinsic motivation. In terms of level of Work Performance, the respondents have outstanding Work Performance in factors such as Strategic Functions, Core Functions, and Support Functions. There is no significant difference in the level of work motivation among respondents when classified according to age, sex, rank/position, and length of service. There is no significant difference in the level of work performance among respondents when classified according to age, sex, rank/position, and length of service. There is a significant relationship between employee motivation and their work performance. This study suggests that the agency should continue to impose projects, programs, and training that could enhance and further develop the work motivation as well as the work performance of PDEA Personnel.

KEYWORDS: Work Motivation, PDEA, Work Performance, Core Functions, Strategic Functions, Support Functions

BACKGROUND OF THE STUDY

Performance has been an indication of the effectiveness of an implementation or course of action. It is undeniable that it has also been a measurement of the efficiency of the planning and mobilization. Further, this was motivated and influenced by many factors. According to Engetou (2017), the flexibility of an organization involves its productivity, and this will determine its organizational performance. The equipment of an organization includes capital, man, machine, and any other human resources. Personnel management had long existed, but nobody had a clue what it meant and the advantages behind it. This is because during the Industrial Revolution, the relationship between managers and their workers was that of masters and slaves, and this led to insufficient personnel as there was a lot of tension between them, thus having a negative influence in the organization. Further, every organization has its objectives and needs sufficient personnel to improve their management positively. Personnel management and human resource management have a great impact on an organization in a positive way. Organizational performance depends much on its personnel to achieve its objectives. Giga and Hoel (2003) stated that impact refers to forces or actions that have a powerful effect that sometimes has on a situation or person. An impact is designed as a situation mainly to influence something or someone. Below are the following impacts: negatively, stress comes as a result of insufficient personnel. This is because stress is a universal element, and as a result, human beings are bound to be stressed. Employees today are critically analyzing the stress management issues that contribute to the lower job performance of an employee, which is originally from dissatisfaction. Analysis shows that there is a negative relationship between stress and job performance, and the results show that if there is an increase in motivation in the work environment and an increase in superior supervision support, there will be an increase in performance, respectively. Also, if the organization’s reputation is at stake and there is a loss of skilled employees, this situation calls for immediate concern from organizational management to employ effective stress management practices to handle the case by increasing employees to increase the organization’s performance. By Republic Act 9165, otherwise known as “The Comprehensive Dangerous Drug Act of 200,” the Philippines Drug Enforcement Agency (PDEA) was created. The enactment of RA 9165 reorganized the Philippine drug enforcement system with the new Dangerous Drugs Board (DDB) that serves as the policy and strategy formulating body and the establishment of a single mission drug agency, the Philippine Drug Enforcement Agency (PDEA), as its implementing arm. On July 30, 2002, the PDEA was officially activated when its first Director General was appointed with a rank equivalent to an Undersecretary. The PDEA is a regular law enforcement agency responsible for efficient and effective law enforcement against any dangerous drug and/or controlled precursor and essential chemicals. However, despite its popularity, the agency has received numerous negative feedback from some groups or communities, which has resulted in unfavorable social stigmas and some perceptions of ineptness. On the other hand, PDEA has partnered with the Philippine Information Agency-National Capital Region to conduct a communication workshop that will analyze their recurring problems and challenges. This move is part of the agency's efforts to improve its image and address the social stigmas that have been associated with its anti-illegal drug programs. With that, this research aims to identify the factors affecting the performance of the PDEA personnel in Region VI.

METHODOLOGY

This study utilized a quantitative research design. The quantitative research design was gathered through a questionnaire and was helpful in assessing the performance of the personnel. More so, the quantitative research design was analyzed and interpreted. The descriptive method is utilized to discuss, interpret, and present the data analyzed by the researcher. This is an important method to thoroughly present the gathered data and analysis of the findings, results, and conclusion. The statistical tool was used to analyze and interpret the data gathered. The respondents of this study are the 10 personnel of the Philippine Drug Enforcement Agency of Region VI who were selected through convenience sampling before the need of the study and to avoid saturation of data. More so, the inclusion criteria for the selection



of respondents are also based on their capacity to answer the questionnaire and the validity of the data. Respondents' personal experiences and ideas were also considered, which are essential to this study. This study was conducted at the Philippine Drug Enforcement Agency Region VI Office, Iloilo City, Philippines. This locale was chosen as to the convenience of the respondent and the researcher. This research focused on identifying the motivation and work performance of Philippine Drug Enforcement Agency personnel in Region VI. This study utilized a quantitative-qualitative type of research. The descriptive method was used to provide thorough discussion and to validate quantitative data. There were 10 respondents to this study, which were selected through convenience sampling for the benefit of the study. This study utilized survey questionnaires approved by the experts and relevant to answer the statement of the problem. The survey questionnaire underwent validity and was patterned based on the suggestions of the experts. The researcher utilized a researcher-made survey questionnaire where questions were relevant to the objective of the study. The survey questionnaire used a Likert scale. The content of the questionnaire was drawn from the agency's functions, wherein Part I contains the demographic profile, Part II was adopted from the multidimensional work motivation scale, and Part III is from the IPCR of the respondents. Further, it was presented to the panel of evaluators for any suggestions, comments, and recommendations for validity and relevance. The survey questionnaire has three parts: Part I will be all about the demographic profile of the respondents; Part II is the level of work motivation of PDEA Region VI personnel in terms of amotivation, external regulation, intercepted regulation, identified regulation, and intrinsic motivation; and Part III determines the level of work performance of PDEA Region VI personnel in terms of strategic, core, and support functions. A letter was given to the respondents asking permission to be the respondents of the study. When the respondents had given their consent, the researcher gave a survey questionnaire to be answered by the respondents. The researcher gave respondents ample time to answer the questionnaire. When the respondents were done answering, the survey questionnaire was retrieved and checked for completeness. The researcher kept all the data and information private and observed confidentiality. Before the conduct of the study, all persons involved will be given a letter for courtesy and information. The researcher informed the respondents about the nature and purpose of the study. Furthermore, the researcher also considered the convenient time for the respondents to answer the survey questionnaire and gave sufficient time to finish. Before distributing the survey questionnaire, the researcher also discussed the objective and purpose of the conduct of the study. More so, the researcher also informed the respondents that all the data and information would be kept confidential and private.

RESULTS AND DISCUSSION

This study aims to identify the level of motivation and work performance of PDEA Region VI personnel toward a contextualized staff development program. The respondents of this study are 6 males and 4 females. The age of the respondents ranges from 20 to 40 years old. Most of the respondents are Intelligence Officer I. Further, most of the respondents have been in service for 7 to 9 years. In terms of motivation, the respondents strongly agree, with a mean of 4.90 indicating that they are motivated to perform duties. In terms of external regulations, the respondents strongly agree, with a mean of 4.80 indicating that they are motivated because they agree with the external regulations of the agency. In terms of Introjected Regulation, the respondents strongly agree with a mean of 4.80. Further, in terms of identified motivation, most of the respondents strongly agree with a mean of 4.80, which means that respondents know the motivation to work for the agency. Finally, in terms of intrinsic motivation, most of the respondents strongly agree with a mean of 4.80, which means that respondents work because of intrinsic motivation. The level of work performance of the respondents in terms of strategic functions is outstanding, with a mean of 4.50. In terms of core functions, the level of work performance of the respondents is outstanding, with a mean of 4.80. Finally, in terms of support function, the respondents' level of work performance is outstanding with a mean of 4.80.

There is no significant difference in the level of work motivation among respondents when classified according to age, sex, rank/position, and length of service. There is no significant difference in the level of work performance among respondents when classified according to age, sex, rank/position, and length of service. There is a highly significant relationship between employee motivation and their work performance. The result of this study suggests that the agency should continue to implement its regulations, provide training and seminars for the continuous development of its personnel, recognize the efforts and sacrifices, and provide assistance that supports growth and improvement among personnel.

CONCLUSIONS

Based on the summary of findings and results of this study, the research has made the following conclusions:

1. The respondents of this study are PDEA Region VI personnel, where 6 are males and 4 are females, aged 20–40 years old. Most of the respondents are intelligence officers and have served for 7 to 9 years.
2. The results of the research show that the PDEA personnel strongly agreed with the indicators that indicated the motivation to perform duties and responsibilities in terms of amotivation, external regulation, intercepted regulation, identified regulation, and intrinsic motivation.
3. In terms of level of work performance, the respondents have outstanding work performance in factors such as strategic functions, core functions, and support functions.
4. There is no significant difference in the level of work motivation among respondents when classified according to age, sex, rank/position, and length of service.
5. There is no significant difference in the level of work performance among respondents when classified according to age, sex, rank/position, and length of service.
6. There is a significant relationship between employee motivation and their work performance.
7. The result of this study suggests that the agency should continue to implement its regulations, provide training and seminars for the continuous development of its personnel, recognize the efforts and sacrifices, and provide assistance that supports growth and improvement among personnel.



A RESEARCH STUDY ON THE IMPACT OF SOCIAL MEDIA FOR WOMEN EMPOWERMENT

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ABSTRACT

Social media complements women's visibility and illustration, supplying platforms for sharing tales and hard stereotypes. It permits get admission to to help networks, educational possibilities, and amplifies voices in activism like Me Too. Social media challenges gender norms, facilitates entrepreneurship, and encourages political participation. It exposes girls to role fashions, promotes frame positivity, and necessitates addressing dangers like cyberbullying for safe, empowering engagement.

KEYWORDS: Social Media, Supplying Platforms, Entrepreneurship, Political, Cyberbullying

INTRODUCTION

Social media platforms offer ladies the opportunity to proportion their memories, triumphs, and demanding situations, improving their visibility and representation. by means of showcasing various girl voices and stories, social media can task conventional stereotypes and promote a greater inclusive understanding of lady empowerment.



Social media allows women to find and be part of groups of like-minded people. those systems facilitate the advent of support networks in which ladies can are looking for advice, share assets, and find encouragement. This sense of community is vital for woman empowerment, offering a basis for collective action and private increase.

EDUCATIONAL POSSIBILITIES

Social media is a valuable resource for gaining knowledge of and private development. ladies can get entry to academic content material associated with profession advancement, personal finance, health, and more. This facts empowers ladies to make informed choices approximately their lives and futures, contributing to their average empowerment.

FINANCIAL EMPOWERMENT THROUGH ENTREPRENEURSHIP

Social media gives girls entrepreneurs a platform to marketplace their organizations, hook up with clients, and develop their brands. It degrees the playing area, allowing ladies to conquer traditional limitations to entry in business. financial empowerment is a important aspect of lady empowerment, and social media performs a significant position in facilitating this.



MULTIPLIED POLITICAL PARTICIPATION

Social media encourages extra political participation amongst women by using supplying facts on political problems and facilitating discussions. ladies can use those platforms to have interaction with political actions, endorse for rules that help gender equality, or even run for political workplace themselves. This empowerment within the political sphere is essential for achieving systemic trade.



EXPOSURE TO POSITION MODELS

Social media offers ladies and ladies get entry to to a wide array of woman role fashions across one-of-a-kind fields and industries. Seeing a success ladies can inspire others to pursue their dreams and spoil thru glass ceilings. This exposure can encourage girls to try for fulfillment and empowerment in their personal lives.



It's miles vital that this dialogue is rooted in feminist theories and in preceding research on gender attitudes and ladies's empowerment. consistent with feminist concept, this paper examines the consequences of gender inequality. on account that ladies and men revel in life and society in specific ways, we also anticipate them to show off variations in how they may be impacted through ICTs. other strands of literature have recognized some of demographic and revel in-related determinants of gender attitudes in addition to social media. in order to assess the impact of social media usage on gender attitudes, the take a look at includes each social media users and non-customers. It estimates the impact of social media use together with a number of nicely-documented factors which are regularly related to gender attitudes consisting of marital status, age, variety of children, and labor-marketplace participation. The paper also can pay particular attention to the interaction between education and social media use, each of which can be part of the modernization and social exchange procedure theorized to lead to multiplied support for girls in public sphere (Daher, 2012). young humans make up most of the people of social media customers, and social media customers are within the method of making norms and conduct of citizen engagement (Xenos, Vromen, & Loader, 2014). consequently, we explore the connection between age and social media use to determine whether social media disproportionately form the attitudes of more youthful humans.





The the rest of this paper proceeds as follows. relevant strands of literature are discussed, inclusive of studies in politics, feminism, and attitude alternate regarding ICTs and social media. ICTs and social media might be mentioned interchangeably at some point of the paper. but, the evaluation issues the usage of social media only, apart from different sorts of ICTs. The paper also discusses the case of Qatar in some element, and attracts relevant comparisons with other MENA international locations worried in the Arab Spring. The findings suggest that social media utilization is strongly related to accelerated guide for girl network management. steady with predictions, social media use affects men and women in another way, as handiest woman users are greater supportive of girl community leadership. concerning education, the findings suggest a nuanced courting between gender attitudes and training, which, although fine, isn't always as strong as that between social media and gender attitudes. ultimately, the consequences regarding age show that social media use is undoubtedly related to feminist gender attitudes amongst young and center-aged adults. consequently, social media use is related to aid for girls in leadership, even in a context in which there is widespread social media get entry to to however confined activism, and will prove to be a tool for mitigating gender inequalities within the destiny.

LINKING SOCIAL MEDIA UTILIZATION AND GENDER ATTITUDES

No matter severa guides, both scholarly and in any other case, debating the position played by means of ICTs, the conclusions within the literature stay disjointed. that is partially because of the belief of a causal connection among social media usage and behavior (whether or not political or gender related), without paying proper attention to the role of attitudes, that are regularly at the root of behaviors. similarly, the literature has given undue weight to the content material of social media posts, which can also



WOMEN IN MEDIEVAL LENGTH

The repote of girls started to say no inside the medieval duration and later Christianity curtailed ladies's freedom and rights. The state of affairs became worse all through this period when Sati, toddler marriage and ban on widow remarriage have become a part of social life among Indian groups. The Muslims introduced the purdah gadget to the Indian society and it became practised by means of nearly all Indian groups. The Devadasis or the temple women were sexually exploited, polygamy became broadly practised, guys had more then one wife and dominted the lives of all the wives. in the Muslim households ladies were confined to the Zenana areas. They had been no longer speculated to are available in the front of men besides their husband. women had been taken into consideration the property of fellows. After her birth she is ruled with the aid of father and whilst she is married she is dominated with the aid of her husband. There have been, however, a few ladies who sparkled like a celebrity inside the dark. They excelled inside the area of politics, literature, schooling and religion. Razia Sultana have become the handiest lady monarch to have ever dominated Delhi. The Gond queen Durgavati ruled for fifteen years earlier than she lost her lifestyles in a warfare. Chand Bibi defended Ahmedabad in opposition to the strong Mughal forces of Akbar in 1590s. Jehangir's wife Nur Jehan efficiently wielded imperial power and turned into diagnosed as the actual pressure in the back of the Mughal throne. The Mughal princesses Jahanara and Zebunnissa have been poets. Shivaji's mother; Jijabai, turned into the queen regent and became an able warrior and administrator.

LADIES ALL THROUGH INDEPENDENCE WAR

The situation began to alternate whilst national figures started out the struggle for India's freedom. Mahatma Gandhi invited assist from girls. ladies like Sarojini Naidu, Vijaya Laxmi Pandit and Mrs. Aruna Asaf Ali became a part of the freedom battle.

MEDIA IN INDIA

The Indian media has come to be exclusive over a period of time. It is composed of different mediums of communications: tv, radio, cinema, newspapers, magazines, and net-primarily based websites and portals, most of which owned via personal or semi-authorities



businesses. conventional media exists no longer best in rural areas but also in city areas. It includes people songs, tune, dance, yatra, drama and theatre, puppetry and road theatre.



Every class of media in India has a wonderful past. Newspapers are the oldest in this context. It started out in 1780 when JA Hicky commenced Bengal Gazette from Calcutta. Cinema came in 1913, radio got here in 1927 in Pune, television in 1959 as an instructing medium but step by step it received popularity and in 1991 Doordarshan started a channel especially for leisure. internet got here to India in the ninth decade of the 20 th century. With the advent of latest technologies and digitalization, many new sorts of media also are coming along with mobile smartphone, i-telephone, i-pad, pocket book, and outdoor media. these new types of verbal exchange are collectively referred to as New Media.

Today, India has greater than 70,000 newspapers and over 690 satellite tv for pc channels. Radio and tv have round 38 crores and thirteen crores customers respectively. the new media is getting famous all over the international. in step with a survey, around 12 crores people are using internet in 2013 and this discern is anticipated to attain 14 crores in 2014. The young population of India is in particular willing toward the social media that consists of fb, Twitter, Youtube, Blogs and many more. now not particularly, there was a mobile smartphone boom. around 25.1 crores people are anticipated to use the mobiles in 2014. unnecessary to say, due to this huge reach many options are open for communicate thru cellular generation.

WOMEN IN INDIAN MEDIA

GIrls had been constrained with the aid of custom and regulation from get admission to to the profession of journalism. They aced discrimination in the career. though, girls labored as editors, reporters, sports analyst and newshounds even before the Eighteen Nineties. these days the situation is converting. ladies are strolling as men's equal. there is a massive quantity of working women and there's hardly any field that doesn't have women representatives. we have ladies directors, marketers, docs, police women, pc professionals, politicians and maximum sudden the complete media business is complete of women in almost all varieties of sports. women inside the media are working in every department as equals of male colleagues and at excessive position positions too. There women who are main the media residence. Many budding girl journalist want to be like overdue Prabha Dutt, Homai Vyarawalla and Barkha Dutt who set a milestone in her career with the aid of overlaying the Kargil warfare in 1999. earlier than, Barkha it turned into her mom, Prabha Dutt who had satisfied her editor in Hindustan times that ladies journalists were desirable for more than reporting the local flower



display on the town, as quoted by means of Barkha Dutt in considered one of her early interviews. late Homai Vyarawalla changed into the Indian female photojournalist, Maya Mirchandani of NDTV, Suhasini Haider of CNN-IBN and Anjali Kamat of america-based totally “Democracy Now” are the few names of Indian journalist who've have become inspirations for every girl journalist in India. however it still a truth that most girl journalist are given tender beats as it's far presumed with the aid of the guys that they can not cowl hard beat news.

It had, on account that its inception, been a full-size resource in mobilizing a couple of empowerment actions for girls and had correctly popularized lots of its ideologies. but, there were instances wherein those moves backfired at the interference of media retailers. The very concept of feminist actions and its core topics have often been widely misinterpreted, thru a couple of social media resources. via this text, allow us to delve deep into the a couple of arenas of women's empowerment that are majorly motivated through media retailers.

MEDIA ILLUSTRATION : EMPOWERING

As you may guess, media is historically recognised for the underneath-significance it provides to ladies. There have been a plethora of eventualities in history wherein women were portrayed as restricted to societal and stereotypical gender roles. Gaye Tuchman, a renowned sociologist, had termed this phenomenon “symbolic annihilation.” He described the term because the underneath-illustration that women face in almost all areas of existence and having their lives narrowed right into a tiny variety of social roles. All fundamental styles of media along with magazines, commercials, information and sincerely the film and amusement industry, have all continually remained providers of symbolic annihilation.

COMPANY SOCIAL DUTY AND LADIES EMPOWERMENT

When Ferguson (1980) completed a content evaluation of women's magazines published between the give up of worldwide war II and 1980, she determined that representations were grouped around the concept of the “cult of femininity,” which turned into founded on conventional, stereotypical lady roles and values consisting of marriage, family, and appearance. She in addition talked about that whereas adolescent publications targeted at ladies did offer a greater diversity of woman portrayals, the emphasis remained on the guy of their lives, his domestic, his circle of relatives or even to the volume of searching accurate for him.

not so tremendously, however alas, all of the predominant Disney films, those that have described our childhoods for us, have traditionally propagated a very stereotypical comic strip for its female characters. due to the fact she is appealing, Snow White—who cleans the dwarves' domestic—is in the end stored by means of a prince. inside the story splendor and the Beast, Belle should put up with a vicious and horrible beast to save him. Ariel sacrificed her voice to apply her frame to gain the prince's affection. Mulan, who nearly wins the warfare with the aid of herself, then returns home to fall in love. Examine greater: a few intellectual fitness issues maximum typically confronted by way of ladies

But, matters have modified for the more top in the latest Disney Productions, like Frozen, Moana and Tangled, in which all their respective girl leads had been portrayed as ladies who're brave, decisive and impartial. The marketing enterprise, on the grounds



that time immemorial, is thought for the narrowing stereotypes it has been propagating via its productions. classified ads for washing powder that function moms and tiny daughters working collectively, whilst guys and boys are coated in dust are an awesome instance of the way women had been regularly portrayed in roles associated with gender stereotypes, specifically the ones associated with housekeeping and motherhood. this could be a completely easy instance to ponder upon, but, it rightly sums up the important eras of the industry.

For the reason that Nineteen Seventies, ladies were granted equality and a far greater range of positions in society than they had in the past. those historical tests of girls's representations have ended in giant adjustments to the jobs that ladies play. consistent with David Gauntlett's argument in his work titled "Media Gender and identity," since the Seventies, there was a lower in stereotyped depictions of girls in the media and an increase within the range of these representations. This trend probably displays broader societal shifts.

THE PSYCHOLOGY BEHIND EMPOWERMENT

Another set of examples of a promising destiny might be that located within the advertising industry. The diversity of women's portrayals in marketing has multiplied for the reason that 2015, as visible through the subsequent examples: The Dove actual splendor campaign⁷² showcased a extensive form of ethnicities and physical kinds. alternatively, sport England has effectively promoted "This woman Can," which later modified to grow to be the "suit got actual" marketing campaign.

THE IMPACT OF SOCIAL MEDIA ON WOMEN ON WOMEN'S EMPOWERMENT

In positive ways, ladies are empowered through the rise in their involvement in and get admission to to self-expression and choice-making via the media and new verbal exchange technology. The media's strong and positive contribution to girls's and gender equality wishes to be advocated and investigated further. Social media has shown to be an powerful device for raising public attention of ladies's rights issues, inspiring protests in cities across the globe, in addition to inspiring selection-makers to increase their pledges to gender equity.

ARE WE NEVERTHELESS FIGHTING THE PATRIARCHY

The upward thrust of cyberfeminism, social media, and ladies's unprecedented usage of latest technology present sizeable probabilities to raise gender equality and women's rights issues inside the public discourse and coverage-making procedures. but, it's far critical to understand that there may be a greater threat that the essential principles of these movements may be misunderstood.

A PSYCHOLOGICAL REVIEW OF THE MOVIE

Consistent with a recent Google evaluation, the net is giving Indian women easier get right of entry to to information and enabling them to make higher selections in their every day lives. Over 60 million Indian ladies utilize the internet to control their every day lives, a hundred and fifty million overall internet customers, according to a June 2013 survey titled "ladies and net look at." today's social media is so powerful that it turns into the voice of the people inside the face of bad and unhappy conditions.

Every body takes to social media to proportion, tweet, and hashtag their evaluations, rage, and demands for justice. To in addition demonstrate their unwavering aid, they regularly even update their profile pix with campaign photos. for instance, within the Delhi Gang Rape case, a easy black dot on a white heritage became used as a profile picture on WhatsApp and different social media platforms. due to the overwhelming interest this tragedy obtained on social media, the Indian authorities became pressured to prosecute the ones responsible and enact more potent regulation to make certain that such incidents don't appear again.

AFFECT OF THE INFUENCER

Even though media can't be claimed to be an identical area for all genders, innovative adjustments are witnessed in multiple regions of the identical. there's definitely desire for a safer and higher destiny in social media, no longer neglecting the reality that pathways to obtain gender sensitization in those areas are to gain knowledge of and ingrained inside its purchasers. girls from all corners and strata of the sector have to be greatly trained to accurately manage and make use of social media and different media agents to popularize their empowerment actions, with the simultaneous understanding that girls completely are not responsible for the mitigation of the virtual gender hole. on the other hand, it's miles something to be completed and worked for through all genders.

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EXPLORING THE TRADITION OF ORACLE BONE AND BRONZE INSCRIPTIONS IN LINGNAN SEAL CARVING THROUGH ZHANG DAJING'S WORKS

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ABSTRACT

[Objective] To study Mr. Zhang Dajing's ancient seal works incorporating oracle bone and bronze inscriptions, explore their relevance to contemporary seal carving creation, and examine the tradition of using oracle bone and bronze inscriptions in Lingnan seal school. *[Methods]* Based on Fu Ding Tang Seal Collection, analyze Zhang Dajing's social connections and explore the ideological origins of his seal carving art; analyze the artistic characteristics of Zhang's oracle bone and bronze inscription seals to seek inspiration for seal creation. *[Conclusions]* (1) Zhang Dajing was skilled at absorbing artistic characteristics from Qin-Han seals and school seals, while extensively drawing from oracle bones, bronze inscriptions, and even tiles and clay seals. His oracle bone and bronze inscription seals present multiple styles. In his later years, he developed a personal knife technique characterized by abandoning sophistication for simplicity and wielding the knife like a brush, which can inspire contemporary seal carving. (2) Zhang Dajing frequently associated with paleographers, scholars, poets, and calligraphy-painting artists. His preference for ancient-style seals and artistic philosophy of learning from pre-Qin era was likely influenced by his teachers and social circle. (3) Zhang's preference for ancient-style seals reflects both his personal artistic philosophy and the Lingnan seal tradition's emphasis on scholarship and using learning to enhance seal carving. This tradition was formed under the influence of Chen Li, Huang Shiling and others, combined with Lingnan's geographical, economic, and historical-cultural factors, and was reinforced through later interactions among Guangdong school seal artists.

KEYWORDS: Zhang Dajing, Social Connections, Guangdong School Seal Carving, Oracle Bone and Bronze Inscription Incorporation

1. INTRODUCTION

Zhang Dajing (1909-1984) was an influential seal carving master in modern Lingnan seal art. His collection *Zhang Dajing's Selected Seal Works* showcases diverse styles, including works influenced by the Zhe School, Wan School, and Qianshan School, as well as numerous seals incorporating oracle bones, bronze inscriptions, and even tile and clay seal elements. This reflects an artistic spirit that both draws broadly from various sources while avoiding adherence to a single school, emphasizing the use of scholarship in seal carving and creating innovation through studying the ancient. This represents both his personal artistic philosophy and a common characteristic among the Lingnan seal carving community at the time, forming a shared aesthetic taste under Lingnan seal carving's historical tradition. Studying Zhang Dajing's oracle bone and bronze inscription seal works can both benefit contemporary seal carving creation and help us better understand the artistic spirit of the Guangdong school of seal carving.

2. FORMATION OF LINGNAN SEAL TRADITION'S EMPHASIS ON PRE-QIN LEARNING

In modern times, Lingnan, as a trading port, developed advanced economy and culture with open mindset, providing an excellent background for artistic development. Its location south of the Five Ridges formed a relatively independent geographical space, bringing relatively independent artistic development characteristics conducive to forming regional traditions.

During the Qianlong and Jiaqing periods of the Qing Dynasty, the Zhe School seal style prevailed. The Lingnan region's seal carvers were naturally influenced by this style. At that time, Lingnan seal artists who followed the Zhe School included: Ke Youzhen, Ke Zhaoliang, Ye Qi, Yang Qiguang, Hu Man, Zhang Jingxiu, Zhang Jiamo, and others. However, as the Zhe School developed into its later period, it gradually formed defects of "bloated, jagged" and formulaic styles. Chen Li (1810-1882), founder of the "Eastern School", proposed the concept of "ancient elegance and simplicity" in response to the Zhe School's defect of purely pursuing a mottled effect through knife techniques. He believed that "the broken strokes in ancient seals were due to weathering, and need not be imitated... those



without visible knife techniques often appear thick and refined; those with visible knife techniques often appear sparse, simple, and wild" (Chen, 1985, p. 452). His seal works often incorporated bronze vessel inscriptions, tile patterns, and brick inscriptions. His aesthetic view of "elegance, correctness, purity and harmony" had a profound influence on later Lingnan seal carving. Republican period artists like Yi Dachang, Deng Erya, Jian Jinglun, Rong Geng, Huang Wenkuan, and others were all influenced by him.

Huang Shiling (1849-1909) had a profound influence on the Lingnan seal community. Through interactions with Chen Li's disciples and students, Huang absorbed and integrated the seal-making principle of "elegant and ancient", while also deriving the aesthetic interest of knife and brush techniques and the beauty of smooth lines from Zhao Zhiqian's seal carving. He proposed aesthetic criteria of "smooth and elegant", forming artistic characteristics of "seeing flow in steadiness, and gracefulness in strength". He also proposed the insight of fusing bell-cauldron inscriptions, small seal script, and Miao seal script "into one to achieve high spirit and ancient meaning" (Liang, 2017, pp. 238-245). He incorporated inscriptions from ritual vessels, weights and measures, coins, pottery, tiles, Han steles, and other text forms into seals for his own use, developing the spirit of "seeking seals outside seals" to the fullest extent. This creative method became a common approach emulated by Lingnan seal artists.

The "Four Masters of Guangdong School" - Yi Dachang (1874-1941), Li Yinsang (1882-1945), Deng Erya (1883-1954), and Jian Jinglun (1888-1950) - were all deeply influenced by Huang Shiling. Yi Dachang excelled at incorporating ancient seals, Li Yinsang mastered ancient seals comprehensively, Deng Erya was known for incorporating clerical and regular scripts, and Jian Jinglun was famous for incorporating oracle bone inscriptions. Yi Dachang was Chen Li's grand-disciple and also received direct guidance from Huang Shiling. His seal works often imitated Three Dynasties bronze vessels, pre-Qin ancient seals, pottery inscriptions, and clay seals, achieving profound artistry. Ma Guoquan commented that "its thickness and simplicity, along with its unrestrained uniqueness, share the same interest as Warring States pottery inscriptions from Qi and Lu regions" (Ma, 1998, p. 73). Liang Xiaozhuang believed that incorporating oracle bone inscriptions into seals was first initiated by Yi Dachang, which influenced Jian Jinglun and others (Liang, 2017, pp. 252-253).

Li Yinsang was passionate about ancient seals, broadly adopting Shang and Zhou bronze inscriptions, with ancient and simple knife techniques and staggered chapter layouts. Huang Binhong evaluated: "The pure whiteness of Xiling is not worth showing off... Your works will likely surpass them" (Huang, 1998, pp. 289-290).

Deng Erya's seal carving drew materials not only from ancient seals, tile patterns, and Han seals, but even incorporated foreign scripts at will. His self-composed poem states "Upward pursuing oracle and bronze inscriptions, also including pottery and tile texts" and "Dare to claim inheritance of the system, I can handle unusual characters" (Liang, 2017, p. 262). Jian Jinglun's oracle bone inscription layouts featured flexible extension and contraction, mutual accommodation and interlocking, creating dynamic visual interest; his knife technique was anciently rough and forceful, thin and strong, natural and transcendent. Han Tianheng evaluated his oracle bone inscription seals: "Creating new horizons for seal carving, becoming a model of self-innovation" (Han, 2013, p. 272).

Under the influence of Chen Li, Huang Shiling and the Four Masters of Guangdong School, learning from pre-Qin and drawing nourishment from bronze inscriptions and unusual characters became a creative approach commonly accepted and emulated in the Lingnan seal community. This formed a creative trend of incorporating oracle bones, bronze inscriptions, and Warring States scripts into seals, as seen in works by He Shaojia, Mo Zhongyu, Ding Yanyong, Mo Tie, Ma Guoquan, Lin Qianshi, Huang Siqian, Ye Yi, Deng Fu and others, who all produced excellent bronze inscription seal works. Besides being influenced by Huang Shiling's seal style, many Lingnan seal artists achieved success by directly learning from ancient seals, Qin-Han seals, and Yuan Dynasty red character seals. These Guangdong seal artists' unprecedented emphasis on scholarship and cultivation outside seal carving continues to this day (Kuang, 2017, pp. 198-199). Additionally, Nanyue State pottery inscriptions, seals, and tile patterns excavated in Guangdong during the early Republican period were compiled into seal albums by Lingnan scholars, becoming study materials for local seal artists. This was also an important reason for the formation of the antiquarian trend in the Lingnan seal community (Liang, 2017, p. 246).

3. ZHANG DAJING'S LIFE AND ARTISTIC LINEAGE

Zhang Dajing (1909-1984), also known as Fu Lao, maintained studios named Xinxiang Hall, Fu Ding Hall, and One Hundred and Fifty Stone Studio. Originally from Jiangsu, he was registered in Nanhai, Guangdong, and lived in the Western District of Guangzhou. Zhang graduated from Changcheng Middle School in Guangzhou. Later he served as a member of the Guangzhou Cultural and Historical Research Institute, advisor to Guangzhou Cultural Park, and consultant to the Guangzhou Young Calligraphers Association.



At age twenty-two, Zhang Dajing studied painting, calligraphy, and seal carving under Cheng Zhuyun at the Shangmei Art Studio in Guangzhou. Cheng Zhuyun (1874-1934), originally named Jingxuan, styled Zhuyun, also known as Longhu Elder and Master of Zhuanxiang Studio, was from Nanhai, Guangdong. Cheng excelled in both seal carving and painting, and founded the Shangmei Chinese Painting Research Institute and Shangmei Art Studio in Guangzhou. His seal carving followed Han seals as the primary model while incorporating Zhe School knife techniques, with quiet and simple line work, pure and proper elegance.

Following Cheng Zhuyun, Zhang Dajing took Han seals as his foundation while also studying the styles of Zhe School, Wan School, Qianshan School, Zhao Zhiqian, Huang Shiling. In his later period, he drew from oracle bones and bronze inscriptions, integrating ancient seals, clay seals, and pottery inscriptions, achieving high mastery across multiple styles. In his early years, he commonly used thin sharp knives, while in his later years he switched to pure knives, creating rough and simple line work with resistance in the strokes, along with hammering on the seal surface, achieving an unintentionally grand and complete artistic style characterized by depth and uniqueness.

In his later years, the master suffered from eye disease and called himself "One-Eye Man". Due to vision problems, he mainly created large seals in his late period. At this time, his seal style did not pursue refinement but became more spontaneous, achieving even greater freedom and completeness. Zhang Dajing had many disciples, with notable ones including Liang Xiaozhuang, Gu Shuan, Fang Boren, and Zhong Zhiming, who are all now renowned in the seal carving community.

The extant seal album of Zhang Dajing is *Fu Ding Tang Seal Collection*. This album contains over a hundred seal works collected by his student Wang Xiang, most without border inscriptions, which were later added by his student Liang Xiaozhuang. The border inscriptions recall the master's life and evaluate his seal carving art. This "collaboration" between teacher and student generations became a notable story. The book begins with title inscriptions by Liang Xiaozhuang and Chen Yongzheng (Chen's inscription reads "Selected Seal Works of Zhang Dajing"). It also includes Liang Xiaozhuang's article "The Ancient and Transcendent Zhang Dajing" as a preface.

4 EXAMINING MUTUAL INFLUENCES OF ORACLE BONE AND BRONZE INSCRIPTION INTEGRATION THROUGH SOCIAL CONNECTIONS IN *FU DING TANG SEAL COLLECTION*

During his lifetime, Zhang Dajing's seal reputation was highly regarded, as "renowned calligraphers and painters both domestically and abroad considered it fortunate to obtain his seal carvings" (Liang, 2017, p. 1). Artists like Pan Tianshou, Xie Zhiliu, Tang Yun, Huang Yongyu, and Wu Hao used his seals extensively. The Wu Hao brothers alone possessed over two hundred of his seal works.

Fu Ding Tang Seal Collection also includes many seals carved for famous painters, calligraphers, seal artists, and scholars. Among these, eleven seals were carved for the paleographer and seal artist Rong Geng, including: "Rong Geng's Seal", two versions of "Rong Geng", two versions of "Rong Geng's Longevity", "Xi Bai's Longevity", "Xi Bai", "Rong Geng's Seal", "Rong Geng's Works After Seventy", "Xi Bai's Works After Eighty", and "Both Person and Writing Have Aged". Rong Geng was slightly older than Zhang Dajing, who respectfully referred to Rong as "Elder Brother Xi Bai", "Elder Xi Bai", and "Old Man Xi Bai" in the border inscriptions. These border inscriptions span twenty years, from 1954 to 1974. Two seals each were made in 1963 (Rong Geng's seventieth birthday), 1964, and 1973 (Rong Geng's eightieth birthday), reflecting their long-lasting close relationship.

Rong Geng (1894-1983) learned ancient characters and seal carving from his uncle Deng Erya. Under Deng Erya's inspiration and guidance, he compiled *Bronze Inscription Compilation*. Rong Geng devoted his life to studying ancient characters, authoring works including *Qin-Han Bronze Inscription Records*, *Song Zhai Bronze Vessel Illustrated Records*, *Overseas Bronze Vessel Illustrated Records*, *Bronze Inscription Continued Compilation*, and *Shan Zhai Bronze Vessel Round Records*. In seal carving, he studied under Deng Erya and privately followed Deng Shiru and Huang Shiling. When studying in Beijing, he encountered more pre-Qin bronze vessel inscriptions, which broadened his horizons and transformed his seal style from school preferences to directly pursuing antiquity, becoming strict and elegant.

He stated, "Ancient scripts should primarily follow the inscriptions on Three Dynasties ritual vessels, supplemented by Stone Drums. Small seal script should primarily follow Qin steles, weights, proclamation tablets, and Xin Dynasty coin inscriptions, supplemented by Li Yangbing's seal script". He also said: "For name seals, red character seals should imitate Zhou-Qin small seals and Han clay seals, while white character seals should imitate Han seals; this is the correct path. Occasionally incorporating elements from bronze vessels, mirrors, coins, and tile inscriptions makes them especially ancient and appealing". Rong Geng's seal work "Jiegang Notice" incorporates bronze inscriptions with clear and strong lines and natural compositional interweaving; "Fu Kan's Longevity" combines bronze inscription characters with Han seal white character line work, fusing them into one, achieving both dignity and thickness. Characters



adapt their size with mutual accommodation and interlocking based on their dimensions, masterfully capturing the layout artistry of ancient seals. Though both were seal carving masters, they commissioned seals from each other. Zhang's seals for Rong Geng include styles of Qin seals and bronze inscriptions that Rong excelled at, with border inscriptions often reading "Elder Xi Bai's Correct Seal Script" and similar phrases, reflecting their mutual exchange and refinement. This also demonstrates how Lingnan seal masters with different lineages influenced and learned from each other. Evidently, Lingnan seal masters' preference for incorporating oracle bones and bronze inscriptions reflected both their individual artistic personalities and the collective stylistic direction of the school.

In 1980, the Guangzhou Young Calligraphers Association was established, with Zhang Dajing, Rong Geng, Shang Chengzuo, Huang Wenkuan, Qin Gasheng, Li Quzhai, Zhu Yongzhai and others serving as consultants. They frequently gathered for activities and exchanges afterward. Many in this social circle were seal masters skilled at incorporating oracle bones and bronze inscriptions. Qin Gasheng (1900-1990), styled Guxun, also known as Luting, was accomplished in oracle bone script, bronze inscriptions, seal script, clerical script, regular script, running script, and cursive script, known as the "Three Qin Excellences" in poetry, calligraphy, and seals. His seal carving completely derived from ancient and Han seals, occasionally incorporating oracle bone script with fascinating results. Shang Chengzuo (1902-1991), styled Xiyong, also known as Qi Zhai. A paleographer and seal artist, he authored works including *Oracle Bone Inscription Categorization*, *Fu's Collection of Oracle Bone Characters*, *Twelve Masters' Bronze Vessel Round Records*, and *Hun Yuan Bronze Vessel Illustrations*. His seal carving excelled at ancient seals, deriving from ritual vessel inscriptions and pottery seals through integration and transformation, achieving pure and elegant character. Huang Wenkuan (1910-1989), styled Yan, also known as Yunshi Road Man, Ping Lu, and Gang Zhai. He named his studios Wa Cun Lou, Fan Zhuo Lou, and others. His collections include *Wa Cun Room Seal Collection*, *Ping Lu Remaining Seals*, and *Ju Wu Xun Meng Room Seal Collection*. Huang had extensive interactions with Li Yinsang, Deng Erya, and others, greatly advancing his seal carving. He excelled at incorporating Han bronze inscriptions, and integrated the roundness of Wan School and angular features of Qianshan School, fusing them into one style.

Zhang Dajing greatly admired Feng Kanghou (1901-1983). Zhang once told his disciples: "Elder Kang's seal carving learned from many masters, achieving synthesis of predecessors' accomplishments, which can be studied and deeply comprehended" (Liang, 2017, p. 3). Feng's seal carving "took Qin-Han as models, Ding and Deng as teachers, fusing Zhe and Wan schools", but when occasionally creating bronze inscription seals, they were also thick and full-bodied, with layouts creating dynamic visual interest and flowing vitality.

Fu Ding Tang Seal Collection includes a seal "Li Tianma's Book Seal". Li Tianma (1908-1990), with studio name Xi Yi Zhai, was from Panyu, Guangdong. A calligrapher and seal artist, Li Tianma also excelled at seal carving, extensively studying Qin-Han ancient seals and Ming-Qing schools, particularly accomplished at incorporating Zhou Dynasty bronze inscriptions, creating ancient, elegant, simple, and innovative works.

The collection also includes eight seals carved by Zhang Dajing for Chen Yongzheng: three versions of "Chen Yongzheng", "Chen Yongzheng Seal", "Yongzheng", "Yongzheng's Longevity", "Yongzheng's Voice Support", and "Yongzheng's Book Collection". Chen Yongzheng was a student of Rong Geng and Li Tianma, a paleographer, poet, and calligrapher. Six seals were carved for poet Liu Yisheng: two versions of "Yisheng's Longevity", "Yisheng", "Yi Elder's Poetry Drafts", and two versions of "Yi Hall". The collection also includes works carved for painter Huang Yongyu, calligraphers Chen Jingshu, Liao Yunyu, Huang Zihou, and others.

From the celebrity seals recorded in *Fu Ding Tang Seal Collection*, we can see that Zhang Dajing's social circle included many seal masters skilled at incorporating oracle bones and bronze inscriptions, as well as paleographers, scholars, poets, and artists. An artist's social circle and teacher-student relationships can indirectly reflect their artistic cultivation and ideological sources. Zhang Dajing's teacher Cheng Zhuyun was a member of the "Guihai Cooperative Painting Society" (later expanded into "Guangdong Chinese Painting Research Association") established in Guangzhou in 1923. This association proposed the slogan of "three excellences" in poetry and literature, calligraphy and bronze studies, and painting and sculpture, advocating their mutual enhancement to achieve higher realms. Cheng Zhuyun's artistic philosophy must have influenced Zhang Dajing. Zhang Dajing achieved extremely high accomplishments in all three aspects of seal carving, calligraphy, and painting. His frequent association with paleographers, scholars, poets, and artists demonstrates both his emphasis on ancient characters, poetry, calligraphy, and painting studies, and indicates that his scholarship was respected by these cultural luminaries.

Liang Xiaozhuang pointed out in *History of Lingnan Seal Carving* that under the influence of Chen Li, Huang Shiling, and others, South Guangdong seal artists particularly emphasized self-cultivation and improving skills beyond seal carving, focusing on textual studies as foundation while broadly connecting with bronze studies and paleography. Xin Chen said "Among inheritors of the Guangdong school seal style, those who achieved outstanding accomplishments were all well-learned scholars" (Xin, 1995, p. 297). They used learning to enhance seal carving, learning from the ancient without being bound by it, not limited by regional schools or adherence to a single



method, learning from many masters to develop their own characteristics (Liang, 2017, pp. 297-299). When analyzing Zhang Dajing's seal carving art, we should note these mutual influences and school characteristics.

5 ANALYSIS OF ZHANG DAJING'S ORACLE BONE AND BRONZE INSCRIPTION SEALS

In his early years, Zhang Dajing began with Qin-Han seals while studying the Zhe School, Wan School, Zhao Zhiqian, Huang Shiling, Wu Changshuo and others. The collection contains many works that capture the essence of these masters. For example: "Chen Jingshu" uses Zhe School cutting techniques, with layout also imitating the Zhe School's angular steadiness. "Yi Hall" shows Wan School impact technique style, with circular flowing beauty, its broken edges reminiscent of Deng Shiru's seal "Flowing Water Sounds Break Thousand-Foot Banks". "Zi Zheng's Poetry Collection" clearly shows Wu Rangzhi's style, with gracefully elongated character forms and flowing dynamic lines. "Xinxiang Hall" follows Zhao Zhiqian's Han white character style, with full and expansive lines, showing dignity and elegant simplicity. "Red Sleeve Adds Fragrance to Night Reading", "Yisheng", and "Spare Time After Medicine Practice" demonstrate Huang Shiling's style, with crisp and vigorous knife work, smooth lines, and layouts showing steadiness with novelty. "Iron Inkstone Worn Through" follows Wu Changshuo's style, with ancient and powerful spirit, well-balanced density, and balanced tilted and upright elements. "White Snow Studio" shows Zhe School knife technique while its layout and spirit closely resembles Qi Baishi, demonstrating Zhang Dajing's ability to integrate and absorb artistic approaches.

From these school-style works, we can see Zhang Dajing's high-level understanding of each school's knife techniques, layouts, and stylistic characteristics. His early years of comprehensive study and integration of various schools laid a solid foundation in technique and aesthetics for later developing new styles. When we expand our view to the entire Guangdong school seal carving community, we can easily find common characteristics: in Guangdong school seal artists' collections, we often see imitations of various school styles achieving such close resemblance that real and imitation become indistinguishable. Yet they often also have self-innovative works not relying on predecessors, developing their own characteristics. This represents the artistic orientation of "limited regional methodology, not adhering to one school, learning from many masters, seeking innovation".

As Zhao Changzhi stated in *History of Chinese Seal Carving*: "Although Shanghai school seal artists took Wu Changshuo as their master, Guangdong school seal artists were influenced by Huang Mufu, and Zhejiang seal artists considered themselves a new school, none strictly adhered to ancestral methods or merely imitated forms. Schools influenced each other, seal artists from various regions learned from multiple masters, styles changed, becoming intricate and complex, more brilliant than any other historical period" (Zhao, 2006, p. 299).

Besides the above school-style works, *Fu Ding Tang Seal Collection* contains numerous ancient-style seals incorporating oracle bones, bronze inscriptions, tile patterns, pottery inscriptions, and clay seals. These works also show diverse styles, robust and simple, rich in bronze and stone spirit. Chen Yongzheng evaluated his seal works as "achieving ancient and transcendent spirit". These were his works that broke free from boundaries and developed his own characteristics. His ancient-style seals can be roughly categorized as follows:

5.1 Refined and Elegant Type

"Rong Geng", "Rong Geng's Seal", and "Chen Rong" follow Qin seal style, with clean and graceful lines and pure, ethereal layouts. In the "Rong Geng" seal, the half-arcs of the two characters echo each other, bringing flowing movement within stillness, with small decorative strokes serving as eye-catching focal points. "Rong Geng's Seal" uses upright positioning unlike the curved forms of the "Rong Geng" seal. The character "zhi" is slightly smaller and "xi" slightly larger, avoiding sparse arrangement. The top stroke of "geng" forms a triangle, with round-dot decorative strokes, creating two small geometric patterns. Many early Guangdong school seal artists had overseas study experience or Western aesthetic foundations, advocating integration of fine art and seal carving. For example, Deng Erya proposed seal carving aesthetic views of "incorporating geometric white space into profundity" and "viewing horizontal and diagonal all as geometry". The artistic spirit embodied in some of Zhang Dajing's refined and exquisite pre-Qin small seals also aligns with Deng Erya's viewpoints.

Additionally, three "Zhang Dajing Seal" works were created in Warring States private seal style. These three seals are very small in size with refined spirit, yet employ bold and powerful knife techniques. Ancient calligraphy theory states that small characters must possess the spirit of large characters. These three small seals, when enlarged, maintain power no less than large seals. Though the three seals contain identical content, their layouts and forms differ entirely, demonstrating Zhang Dajing's superior artistic handling ability.

5.2 Pure and Classical Type

Another style of Zhang Dajing's ancient seals incorporates Shang-Zhou bronze inscriptions, capturing the essence of Shang-Zhou ancient seals, appearing pure and classical, quiet yet dynamic. "Dajing's Casual Works" uses bronze inscriptions with predominantly curved momentum. The characters "Da" and "Jing" are relatively formal, while "Xian" boldly tilts, with the following three characters arranged



in sequence, either intersecting, supporting, or echoing, creating significant movement at the seal's center while maintaining coherence within the flow. The space between "Da" and "Xian" particularly draws attention. The right portion's stillness and left portion's movement create a dynamic-static harmony. "I Value Human Literary Destiny" primarily uses vertical straight lines, emphasizing the characters' vertical strokes, creating vertical momentum and sense of textual columns. "Finding novelty within steadiness" characterizes this seal, employing numerous diagonal lines to break the steady form, such as the diagonal lines in "Wo", "Ren", "Wen", and even the horizontal lines in "Jian" and "Zhong" take slight diagonal positions. Moreover, "Wen" and "Yuan" cleverly intersect with characters above and beside them, making the entire seal show novelty within steadiness, seeking liveliness within stability.

"Lishi Xuan" adopts the common "U-shaped" layout found in ancient seals, with the "Shi" character lowered to create large space above, while the "Li" character and right component of the "Che" character are raised to create two slightly smaller white spaces below, forming a triangular arrangement of three spaces that interweave with the U-shaped text arrangement. "Mo Yun Lou" places the center of gravity in the upper right, boldly leaving the lower left empty, while cleverly breaking the void with two vertical lines, again demonstrating superior spatial handling ability. In "Geng Shen", all vertical strokes in the "Shen" character lean right, while the three vertical strokes in "Geng" gradually straighten, achieving an artistic effect of slant returning to upright. When teaching students, he said: "The principles of 'dangerous precipices' and 'level correctness' in *Book of Calligraphy* also apply to seal carving" (Liang, 2017, p. 3). This style of Zhang Dajing's work, with its intersecting vertical and horizontal layout, perfectly embodies the principle of finding novelty within steadiness. Chen Yongzheng evaluated his seals: "His layouts are extremely strict, with careful attention to spacing density and weight distribution, seeking proper arrangement, achieving ancient and transcendent meaning" (Liang, 2017, p. 323).

"Ba Fen Shu Er" leaves red space in the upper right corner, with four diagonal lines showing subtle variations in angle and height. Though the characters "Shu" and "Er" have numerous strokes, they are intentionally compressed, appearing especially tight. The central axes of the two characters are offset yet echo each other, merging into one. The final horizontal stroke of "Er" pulls back to the right, both stabilizing the offset axis and forming an organic connection with the right side. This seal boldly leaves red space in sparse areas while compressing dense areas into one mass, achieving the artistic effect of "sparse enough for horses to gallop through, dense enough to block the wind".

5.3 Bold and Primitive Type

In his later years, Zhang Dajing had to adapt his seal material and carving table due to health conditions, but these forced changes led to another style of bold and genuine ancient seal work. In the border inscription of "Fu Ding Tang", Liang Xiaozhuang mentioned:

"In his later years, Master Zhang Dajing suffered from eye disease and mostly created large seals. Moreover, due to age and physical weakness, fearing insufficient hand strength, he preferred using soft soapstone as seal material".

Under conditions of impaired vision and hand strength, Zhang Dajing used blunt knives with sliding force, wielding the knife like a brush, not pursuing details but making bold moves, comprehensively applying techniques of impact, cutting, and hammering. His lines became substantial and strong, like axe-chopping and chisel-carving, powerful and sharp. Zhang once said, "Handle the knife as holding a brush, knife spirit like brush spirit... without knife spirit, it cannot be called seal carving". His three bronze method seals for "Fu Ding Tang", using blunt knives for either heavy or light impact, either cutting or hammering, created lines as hard as chiseling, forming a highly personal characteristic knife technique style that distinguished him from other masters skilled in bronze inscription ancient seals. Yi Dachang also favored blunt knives, proposing concepts of "blunt knife hard entry", "contrary knife like casting", and "using blade like laying brush for writing". Zhang Dajing learned the spirit while changing the substance, exemplifying learning from the ancient without being bound by it. His knife technique style even carries some flavor of "modern seal style". Though Lingnan seal artists were known for emphasizing learning from the ancient, in this pioneering region of reform, their avant-garde thinking was not necessarily inferior to central plains masters.

His "One Hundred and Fifty Stone Studio" oracle bone script seal shows thin and hard lines with sharp knife edges, decisive and determined. Although soapstone is naturally soft and difficult to achieve crisp and thin effects, Zhang Dajing's ability to achieve such results demonstrates his profound knife technique mastery. His "Age Seventy-Two in Xin You Year" oracle bone script seal shows bold and substantial lines, different from other Lingnan seal artists like Jian Jinglun and Qin Gasheng, forming his unique personality.

An excellent artist should be able to skillfully transform personal limitations into advantages. Just as Su Shi's single-wrapped brush grip created his characteristic left-graceful-right-sparse and towering right-corner structural features, and Huang Tingjian's trembling habit transformed into his "leaking roof trace" brush technique. Zhang Dajing's declining eyesight and hand strength did not constrain him; instead, by abandoning refinement for simplicity, he achieved his most distinctive knife technique style. Studying Zhang Dajing's seal carving artistic philosophy may offer considerable inspiration for our seal carving creation.



6 CONCLUSION: FURTHER DISCUSSION ON THE "GUANGDONG SEAL" TRADITION

Zhang Dajing's seal carving took Qin-Han seals as foundation while broadly incorporating styles from Zhe, Wan, Qian, Wu, and Zhao schools, achieving high mastery in both Qin-Han seals and school styles. He also extensively drew from oracle bones, bronze inscriptions, and even tiles and clay seals, with his oracle bone and bronze inscription ancient seals displaying multiple styles. In his later years, due to health conditions, he abandoned refinement for simplicity, wielding the knife like a brush without pursuing details, making bold moves, forming a highly personal knife technique style. Studying Zhang Dajing's seal carving artistic philosophy can inspire contemporary seal carving creation.

Using the seals recorded in *Fu Ding Tang Seal Collection* as an entry point, this paper examined Zhang Dajing's social connections. His frequent association with paleographers, scholars, poets, and artists demonstrates both his emphasis on ancient characters, poetry, calligraphy, and painting studies, and indicates that his scholarship was respected by these cultural luminaries. Zhang Dajing's preference for ancient-style seals and artistic philosophy of learning from pre-Qin era was likely influenced by his teachers and social circle.

From examining South Guangdong seal artists who were Zhang Dajing's contemporaries and associates skilled at incorporating pre-Qin bronze inscriptions, we can see that Zhang's preference for ancient-style seals reflects both his personal artistic philosophy and the Lingnan seal tradition's emphasis on scholarship, using learning to enhance seal carving, taking textual studies and paleography as foundation, and advocating integration of poetry, calligraphy, painting, and bronze studies. This tradition was formed under the influence of Chen Li, Huang Shiling and others, combined with Lingnan's geographical, economic, and historical-cultural factors, and was reinforced through later interactions among Guangdong school seal artists.

In *History of Lingnan Seal Carving*, Mr. Liang Xiaozhuang provided a clear definition of "Lingnan School" seal carving as a regional artistic community residing in Guangdong that emphasized scholarly cultivation, stressed innovation while maintaining both refined and popular appeal in their mutual research activities. He believed that Guangdong's open atmosphere as a revolutionary birthplace brought about the local artistic community's innovative spirit; Chen Li's scholarly approach and Huang Shiling's seal style fostered South Guangdong seal artists' tradition of learning from the ancient while developing new styles; and the establishment of the Haoshang Seal Study Society provided a strong foundation for South Guangdong seal artists' mutual activities and exchanges. Mr. Liang Xiaozhuang's viewpoint is quite insightful. However, we can continue to ask: Why did Guangdong, with its relatively open and innovative style and comparatively less traditional cultural or excavated cultural relic materials than central regions, develop such an antiquarian tradition? Besides the influence of scholars like Chen Li, what other cultural and ideological factors existed? What are the most essential differences between "Lingnan School" seal style and other schools? Has this core changed to this day? Perhaps these questions are all valuable directions worth further in-depth research when continuing to study the Lingnan seal school in the future.

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Research Focus: History of Calligraphy and Documentary Research

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JAPANESE ADAPTATION AND RECEPTION OF *THE PEONY LANTERN*

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ABSTRACT

*After the Chinese classical literary work *New Tales While Trimming the Lamp* was introduced, it spread to Japan through the Korean Peninsula and gradually became popular in Japan. Among its stories, *The Peony Lantern* went through stages of translation, adaptation, and recreation, greatly enriching Japanese literature and playing a significant role in its development. This paper examines influential adaptations by analyzing Japanese adaptations and reception of *The Peony Lantern*, while also exploring new forms of classical literary works' dissemination in modern times and the importance of their transmission in the digital context. The aim is to enrich our understanding of classical adapted literary works, explore the East Asian inheritance of *The Peony Lantern*, and deepen our understanding of the profound cultural origins between China and Japan.*

KEYWORDS: *Classical Literature, Adaptation, Kaidan*

1. RESEARCH BASIS

This research focuses on the adaptation and reception of *The Peony Lantern* in Japan, systematically examining its dissemination trajectory and influence to explore the characteristics and patterns of Chinese classical literary works in cross-cultural communication. The study employs multiple research methods including literature analysis, comparative research, and cross-cultural communication, focusing on the adaptation characteristics, dissemination methods, and reception effects of *The Peony Lantern* in different historical periods. Through in-depth analysis of representative adaptations, this study explores the patterns and development trends of Chinese classical literature in Japan, providing theoretical support and practical reference for promoting the international dissemination of Chinese culture. Meanwhile, this research also focuses on exploring the innovative dissemination of classical literary works in the digital age, offering new ideas and methods for promoting China-Japan cultural exchange.

1.1 Research Background

"Adaptation" (Adaptation refers to the creative method of imitating and adapting foreign ancient literary works by incorporating Japanese local elements for rewriting. The same applies throughout the text.) as a special literary form in modern Japanese literary history based on foreign literature creation, research on its content comparison and "reception" is essential. Our classical novel *The Peony Lantern* from Qu You's ghost novel *New Tales While Trimming the Lamp* preceded *Strange Stories from a Chinese Studio* by nearly 300 years, pioneering Chinese Ming and Qing Dynasty strange tales. After spreading to Japan through the Korean Peninsula, in 1666, Japanese monk Asai Ryoi "adapted" it into *Botan Dōrō*; later San'yutei Encho adapted it into *Kaidan Botan Dōrō*, which became popular in Japan and one of Japan's three major "Kaidan" (Kaidan refers to horror stories about yokai, ghosts, etc.) stories, greatly promoting the development of Japanese "legendary literature" (Legendary literature refers to fantasy novels with strange content, the same applies throughout the text). Tadakawa (1998) pointed out that with the introduction of *New Tales While Trimming the Lamp* to Japan and its widespread circulation, *The Peony Lantern* was continuously accepted by Japanese literature and had a profound influence on Japanese literature and arts, "even feeling as if it shouldered the genealogy of (Japanese) early modern Kaidan literature".

Since the 1980s, domestic academia has conducted research on *New Tales While Trimming the Lamp*. Research content mostly focused on content comparison of "legendary novels" and the study of Chinese classical novels' spread and reception in East Asia. These studies mainly focused on the overseas circulation and influence of *New Tales While Trimming the Lamp*. However, there is limited research on the evolution and reception of its included work *The Peony Lantern* in Japan. Research on modern "reception" that transcends the literary framework in other artistic fields is even scarcer. Su (2018) believes that examining the spread and reception of *New Tales While Trimming the Lamp* in East Asia helps us understand the commonality and uniqueness of East Asian literature, as well as different ethnic groups' aesthetic styles and cultural psychology. Zhang (2020) discussed the "reception" of *New Tales While Trimming the Lamp* in



Japan, which went through three stages of "translation, adaptation, and recreation", and *The Peony Lantern* was continuously adapted and reconstructed by Japanese writers after translation. Xiao (2022) believes that the spread of *The Peony Lantern* in Japan transcended the literary field, presenting Japanese-style *The Peony Lantern* to Japanese audiences in various colorful art forms.

From previous research, it can be seen that domestic academia's research on Japanese adapted novels mainly focuses on comparative analysis between original works and adapted works, or analysis of their adaptation or reconstruction process, and analysis of "reception" in the literary field. There is less research on new forms of "reception" such as modern manga and film adaptations. Research on how to bring Chinese classical literary works back into Japanese public view in the new era is also relatively blank. Therefore, in the context of "Digital+", how to expand the "reception" path of Chinese classical literature in Japan based on "adapted novels", using modern technology such as multimedia to "spread China's good voice", "understand contemporary China" and "digital empowerment" are also important aspects this research hopes to explore.

1.2 Research Significance

President Xi Jinping (2016) pointed out that storytelling is the best way for international communication. We should innovate foreign discourse expression methods, study the habits and characteristics of different foreign audiences, adopt concepts, categories, and expressions that integrate Chinese and foreign elements, combine "telling our own stories" with "others telling stories", making stories more recognized by international society and overseas audiences. China and Japan are geographically adjacent with shared cultural origins and a long history of literary exchange. Famous Japanese civilization historian Kato Shuichi once pointed out: "Japanese people of every era express their thoughts mainly in concrete literary works rather than abstract speculative philosophy" (Katō, 2011). It can be said that literary exchange has played a crucial role in the interaction between Chinese and Japanese civilizations.

There are many "adapted literary works" in Japanese literary history created through imitating and adapting Chinese classical literary works. On one hand, they greatly enriched Japanese literature and played a huge role in promoting the development of Japanese literature. At the same time, they objectively promoted cross-cultural exchange and border-crossing between China and Japan. Although *The Peony Lantern* was adapted multiple times after being introduced to Japan, its inherent content of "rewarding good and punishing evil" has been consistently used, invisibly realizing the vision of shaping our national image and highlighting China's profound historical heritage. In the new era, with the continuous improvement of our comprehensive national strength and international status, international society's attention to our country is unprecedented. Research on the "adaptation" and "reception" of *The Peony Lantern* can not only enrich the relevant content of *The Peony Lantern* adapted literature research but also provide materials for further exploration of the Japanese literary world's "reception" research of *The Peony Lantern* after the Meiji period. Meanwhile, by understanding the types and development of "adaptation", we can discover its advantages and limitations, further appreciate the profound influence of Chinese classical literature on Japanese literary works, and explore the characteristics of Japanese audiences. Additionally, "adapted literature and reception" has important practical significance for exploring the East Asian inheritance of Chinese literature, seeking the deep cultural origins between China and Japan, and initiating dialogue between Chinese and Japanese literature. For the new era of telling Chinese stories through Chinese classical literary works, telling the story of Chinese excellent culture well, and better "telling China's story and spreading Chinese culture", it has very important reference significance.

2. ADAPTATION AND RECEPTION OF THE PEONY LANTERN

Before discussing the Japanese adaptation and reception of *The Peony Lantern*, it is necessary to explain the research methods and framework. This study mainly uses literature review, text analysis, and comparative research methods to examine important adaptations of *The Peony Lantern* in Japan and analyze its dissemination characteristics and reception in different periods. The research will focus on representative works from the Edo period and modern times, exploring their changes and innovations in the dissemination process. Meanwhile, this study also pays attention to examining new forms of dissemination of *The Peony Lantern* in the digital age, hoping to provide reference for the modern dissemination of classical literary works.

2.1 Dissemination and Reception in the Edo Period

Compared to *The Peony Lantern*'s ordinary status in China, its widespread dissemination in Japan can be described as "flowers blooming better outside the wall". Through translation, adaptation, and transformation of *The Peony Lantern*, a series of very famous works called "Botan Dōrō" was formed in Japanese literary circles. This not only demonstrated its vitality and influence as a Chinese classical literary work but also promoted cultural exchange and literary innovation. The reception forms of *The Peony Lantern* in Japan mainly manifested in two ways: adaptation and translation. Adaptation refers to re-creation based on the original work, while translation refers to translating the original work into Japanese. The following introduces several influential adapted works.



According to existing materials, *The Peony Lantern* was transmitted to Japan through the Korean Peninsula in the 17th century. Earlier works like Korean scholar Yun Chun-nyeon's *New Tales While Trimming the Lamp with Sentence Explanations* paved the way for the spread of Qu You's classical Chinese novels. However, in terms of circulation and influence, it is generally believed to have started with Japanese monk Asai Ryōi's creation of *Otogi Bōko*. This work had rich and diverse themes, covering content including strange tales, love stories, etc. It included 18 stories rewritten in Japanese from *New Tales While Trimming the Lamp* and is known as the ancestor of Japanese Kaidan novels. As a representative of "adapted novels", *Otogi Bōko* not only retained the basic plot and theme of the original work in the process of adapting Chinese strange tales but also incorporated Japanese local cultural elements. This not only improved its dissemination and acceptance in Japan but also promoted the development of Japanese early modern literature.

Subsequently, famous Japanese Edo period writer Ueda Akinari created *Tales of Moonlight and Rain* based on *The Peony Lantern*. *The Cauldron of Kibitsu*, as one of its short stories, tells the story of a talented and beautiful woman who chose to commit suicide due to an unfortunate marriage and ultimately turned into a fierce ghost to take revenge on her husband. It combines Chinese traditional strange elements with Japanese local Shinto beliefs, not merely describing human-ghost romance but also representing Ueda Akinari's reflection on human nature and social phenomena in the context of ancient Japanese society.

San'yutei Encho combined different versions of *Botan Dōrō* circulating at the end of the Edo period to create the rakugo performance *Kaidan Botan Dōrō*, which, along with "Yotsuya Kaidan" and "Sarayashiki", is known as Japan's three major Kaidan. This work tells the story of Iijima Heizaemon's daughter O-Tsuyu who died for love, and after death, she and her maid O-Yone meet her lover Shinzaburo every night carrying a peony lantern. In addition to continuing the plot of unfinished love between humans and ghosts, it also reveals the contradiction between loyalty and filial piety, with loyalty triumphing over filial piety in the ending, indirectly highlighting the social form that Japan pursued at that time.

2.2 Modern Dissemination and Reception

The *Kaidan Botan Dōrō* series, as a literary work occupying an important position in Japanese literary history, has had a profound influence on later literary creation. Meanwhile, *Kaidan Botan Dōrō* also has rich forms of dissemination in the new era, such as TV drama adaptations. For example, in 2019, *Reiwa First Year Version: Kaidan Botan Dōrō* was broadcast in Japan as a horror drama starring Ono Machiko and others, presenting a modern perspective of the story. Such works, as products of China-Japan cultural exchange, have become an indispensable part of China-Japan cultural exchange with their profound themes and rich plots.

Furthermore, the development of digital technology has posed new demands and paths for cultural dissemination and exchange in the new era. Digital technology has a profound impact on the protection and dissemination of classical literary works. Meanwhile, exploring innovative dissemination of classical literary works is particularly important and necessary in the context of "telling China's story well" and "digital empowerment". Through forms such as digitization of classical works, their stories and connotations can be more effectively preserved and promoted, while providing richer forms for reference materials, thereby promoting the modernization of classical literature research and dissemination. Its applications are diverse, such as using bibliometric methods to evaluate the academic value and influence of classical literary works. Using data such as citation counts to evaluate their academic status, or quantitatively describing the development trends of classical literature from an overall perspective helps understand the general characteristics of literature in specific periods. In short, digital technology has played a positive role in protecting and disseminating classical literary works. Through new methods such as digital humanities platform applications and literary dissemination in the new media information age, it has not only improved the research level and dissemination efficiency of classical literary works but also created new forms of expression and experience for literary works.

3. CONCLUSION

Through research on the adaptation and reception of *The Peony Lantern* in Japan, we can deeply analyze the strong vitality and cultural adaptability demonstrated by Chinese classical literary works in cross-cultural communication. Since the Edo period, Japanese literary circles have adapted and innovated *The Peony Lantern* at multiple levels and dimensions, forming the distinctive "Botan Dōrō" series of works. These adaptations not only retained the core themes and ideological connotations of the original work but also incorporated Japanese local cultural elements, achieving the localization transformation of literary works. This successful cross-cultural adaptation practice provides an inspiring typical case for exploring the overseas dissemination of Chinese traditional culture. Notably, this adaptation process both maintained the artistic value of the work and gave it new contemporary significance, demonstrating the strong inclusiveness and extensibility of Chinese classical literary works in a heterogeneous cultural environment.



The dissemination process of *The Peony Lantern* in Japan fully demonstrates the influence and adaptability of Chinese classical literature. From Asai Ryōi's *Otogi Bōko* to Ueda Akinari's *Tales of Moonlight and Rain*, and to San'yūtei Enchō's *Kaidan Botan Dōrō*, each adaptation has endowed the work with new cultural connotations and contemporary characteristics. This continuous innovative adaptation not only greatly enriched Japanese literature but also built an important bridge for China-Japan cultural exchange. Especially in shaping China's national image and showcasing Chinese cultural charm, these adapted works have played a positive promoting role. Through research on these adapted works, we can clearly see the dissemination trajectory of Chinese classical literature in Japan and its profound influence in different historical periods, which has important academic value for understanding the history of China-Japan cultural exchange.

In the new era context, the dissemination of *The Peony Lantern* presents new characteristics and development trends. With the rapid development of digital technology and increasingly diverse media forms, the dissemination carriers of this work have broken through traditional text forms and extended to multiple fields such as TV dramas and digital media. This innovation in dissemination forms has not only improved the accessibility and influence of the work but also provided useful reference for the modern dissemination of classical literary works. Especially in the "Digital+" context, classical literary works have gained broader dissemination space and more diverse forms of expression through new media platforms and digital technology. This innovation in dissemination methods not only helps expand the work's audience but also opens up new paths for the modernization of classical literature dissemination.

The arrival of the digital age brings new opportunities and challenges for the dissemination of classical literary works like *The Peony Lantern*. Through modern technological means such as digital humanities platforms and new media dissemination, we can more systematically protect and disseminate classical literary works, significantly improving research efficiency and dissemination effectiveness. With the support of big data and artificial intelligence technology, the compilation, research, and dissemination of classical literary works have gained new development space. This not only helps protect and inherit classical literary works but also provides new ideas and methods for exploring "telling China's story well". Meanwhile, the application of digital technology also provides new research methods and tools for classical literature research, enabling researchers to conduct in-depth analysis and discussion of works from more dimensions.

This study shows that research on the Japanese adaptation and reception of *The Peony Lantern* has important practical significance and theoretical value. It not only deepens our understanding of China-Japan cultural exchange history but also provides useful insights for promoting the international dissemination of Chinese culture in the new era. By examining the dissemination process of *The Peony Lantern* in Japan, we can better understand the opportunities and challenges faced by Chinese classical literary works in cross-cultural communication. Future research directions can further explore innovative applications of digital technology in classical literature dissemination, and conduct in-depth research on how to enhance the international influence of Chinese classical literature through innovative dissemination methods. Meanwhile, attention should also be paid to how to achieve innovative expression in modern communication contexts while maintaining the cultural core of the works, thus better serving the international dissemination of Chinese culture and international cultural exchange. This will not only help enhance the international influence of Chinese classical literature but also contribute wisdom and strength to building a community with a shared future for mankind.

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EXPLORING THE COGNITIVE INVOLVEMENT OF EFL STUDENTS DURING THEIR REVISION PROCESSES OF TEACHER FEEDBACK

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ABSTRACT

This study explores the cognitive engagement of intermediate EFL university students with teacher written corrective feedback (WCF) during their revision processes. The investigation focused on three sub-dimensions of cognitive engagement: depth of processing, cognitive strategies, and metacognitive strategies. Data were collected over three months through multiple methods, including the analysis of students' drafts, teacher feedback, stimulated recalls, and semi-structured interviews. Findings revealed five levels of depth of processing (unconscious disregarding, intentional neglecting, noticing, inaccurate understanding, and accurate understanding), highlighting variations in how students processed feedback. Cognitive strategies, such as reasoning and memorization, and metacognitive strategies, including planning and reviewing, were identified as critical components of engagement. The interplay between cognitive and behavioral engagement was also observed, particularly in students' use of external resources for reviewing drafts. While personality traits and proficiency levels influenced engagement, the findings emphasized the complexity and multidimensional nature of learner engagement with WCF. Limitations include the short research period and a homogeneous sample. Future research could explore engagement over a longer duration and across varying proficiency levels to yield deeper insights.

KEYWORDS: *Teacher Written Corrective Feedback, Cognitive Engagement, Depth of Processing, Cognitive Strategies, Metacognitive Strategies, Second Language Writing, Efl Students*

1. INTRODUCTION

The adaptation of teacher written corrective feedback has been popular among both teaching teachers and researching scholars (Moser, 2020). For the most of writing teachers, when they want to correct errors on their students' drafts, one of the most preferred methods is the delivery of written feedback, since it could be delivered conveniently. For the scholars working on the field of second language writing, they have long been focusing on the effectiveness of teacher written corrective feedback because of its prevalence and usefulness. Furthermore, the number of research started to plummet since Truscott (1996) started to question the effectiveness of written feedback on students' writing performance. Much effort has devoted to explore the types of teacher written corrective feedback, the comparisons between or among different feedback methods, and how to improve the effectiveness of teacher feedback (e.g. Sheen, 2010; Yoo, 2009).

While the findings concerning the effectiveness of teacher corrective feedback was controversial, the definition of this specific type of feedback has reached consensus. For most scholars, corrective feedback was also named as grammatical feedback, linguistic feedback or written error feedback. It refers to the written forms of feedback provided by the teachers on the students' writing texts (Lee, 2013). No matter the students are first language learners or second language learners, or regardless of the context of ESL or EFL, the usages of teacher written corrective feedback are prevalent. However, one of the most serious problems concerning writing teachers are that they have always discovered their students repeating the same mistakes on their writing texts, even when the errors were pointed out by the teachers repetitively (Yu, Jiang & Zhou, 2023). This led to frustration to most teachers since the provision of written corrective feedback on each student's written work has not been an easy task, as it requires a significant amount of time and efforts.

As mentioned before, a lot of studies have been done in the field of teacher written feedback. Most of them concentrated on exploring what factors contributing to a higher level of effectiveness generated by teacher feedback. While these discoveries have shed light on the importance of written corrective feedback, these studies were conducted based on the hypothesis that the student participants were passive learners that showed no activeness in the learning process (Zhang & Hyland, 2022). However, in actuality, students play a crucial role in engaging with each learning process, and it is sometimes the level of engagement that contributes to the learning performance and results. It is, therefore, essential and necessary to design further research directed towards exploring corrective feedback from the students' perspectives. One of the ways to examine a learning activity from the students' perspectives is to look at how students cognitively process a teacher practice. By conducting research in this way, findings are expected to provide new



insights to understand a teaching method (Polio, Fleck & Leder, 1998).

Therefore, the current study was designed to explore how undergraduate students cognitive engage with their teacher's written corrective feedback from a context of authentic classroom. Purposive sampling will be used to target suitable writing teachers and also student participants.

2.LITERATURE REVIEW

Teacher written corrective feedback (WCF), which was a term used to describe linguistic feedback provided by the language teachers on their students drafts, has been a popular and universal teaching methods to help language students improve accuracy on their written work. Since it has been used internationally and frequently, the feedback approach has generated considerable discussion in the academic literature (e.g. Bitchener, 2008; Ferris, 2006, 2010; Truscott, 2007).

After his argumentation, subsequent studies have been conducted to evaluate this conclusion, which proved that teacher WCF have been beneficial for both the students' revisions as well as their subsequent writing performance (Bitchener, Young & Cameron, 2005; Van Beuningen, De Jong, & Kuiken, 2012). This growing body of research has led to a focus shift from exploring whether WCF was effective to what types of WCF were more effective. For example, there were comparisons between indirect feedback and direct feedback (e.g. Kubota, 2001). Additionally, there were other studies focusing on whether the scope of feedback influenced its effectiveness, such as a comparison between comprehensive feedback with focused feedback (e.g. Ellis, Sheen, Murakami & Takashima). While these studies provided exciting findings concerning the effective feedback, they were often conducted based on the assumption that the students were passive receivers. Therefore, more studies are needed to explore teacher WCF from the students' dimensions, to see how students, as active participants, engage with teacher feedback for revisions.

While the importance of learner engagement has been acknowledged in recent years, there is still a lack of research focusing on this concept. According to Ellis (2009), one of the dimensions in student engagement concerns the students' cognition. It refers to the degree of cognitive investigation students exhibit when processing teacher feedback. To be specific, it involves the depth of processing, the cognitive strategies and metacognitive strategies utilized during the students' revision process. In terms of the depth of processing, it refers to the different cognitive levels at which students notice feedback, such as merely noticing the feedback or understanding the feedback (Qi & Lapkin, 2001). Additionally, the cognitive strategies pertain to how students allocate mental resources and proactive thinking regarding the reactions to feedback. Metacognitive strategies, on the other hand, involve how students monitor and regulate their mental effort throughout the revision process (as illustrated in Table 1).

Table 1: the Modified definitions of students' cognitive engagement with teacher written corrective feedback

Learner engagement	Sub-dimensions	Explanations
Cognitive engagement	1)Student's depth of processing	The extent to which students involve in a detailed and elaborate mental analysis when responding to teacher written corrective feedback
	2)Students' mental effort in using cognitive strategies	The amount of mental effort and concentration that students invest when they apply specific cognitive strategies consciously or unconsciously to process teacher written corrective feedback
	3)Students' mental effort in using metacognitive strategies	The degree of cognition and mindfulness that students invest when they apply specific metacognitive strategies consciously or unconsciously to monitor and regulate their cognitive effort

3.METHODS

3.1 Participants and Research Context

Five intermediate year-two students minored in English were chosen from a university in the northern part of China. Their ages were ranging from 19-20, and they all volunteered to participate in the current research after a detailed explanation of the study. Besides their willingness to participate, the selection criteria also included: the ranking of their average writing scores from their previous writing tasks and the Teacher A's recommendation. In sum, their selection criteria were three-fold. To understand more clearly, there were 30 students in Teacher A's class.



To protect their privacy, these students will be referred to Student A, B, C, D, and E. To ensure that they obtained the degree of English as their second degrees, they were required to attend all the English-related courses. The table below furnished more background information of the student participants.

Table 2: The Detailed Information of the student participants

Name	Age	Gender	Major	Ranking in year-1 writing performance
Student A	19	Male	Law	14
Student B	19	Female	Japanese	15
Student C	20	Female	Applied statistics	16
Student D	20	Female	Applied statistics	17
Student E	19	Female	Biological science	18

The current course the students took was *English Writing (Level 1)*. Their teacher, Teacher A, was purposively chosen since he was the only teacher at the Department of English that adopted process writing. When I realized that his usage of feedback approach suited my study, I approached him right away and explained my study to him. I specifically highlighted that there would be no intervention introduced to his class and no teaching methods needed to be modified during the research. After serious consideration, Teacher A decided to participated in.

Teacher A held a Doctoral degree in Linguistics and had more than five years' teaching experience. In fact, he has been teaching the course of English Writing since he first entered the University. In Teacher A's class, he required his students to submit two writing homework with two drafts.

To be specific, unlike the majority of the teachers at the same apartment that only required their students to write a draft and provided no feedback, Teacher A focused more on how students utilized his feedback to make revisions. Therefore, in his class, his students needed to submit a first draft, wait for the feedback, and make revisions based on their teacher's feedback. This approach allowed me, the researcher, to have access to exploring the processes where students took advantage of teacher feedback for revisions.

Teacher A explained that he believed that only by asking his students to write a task without providing any feedback was useless. In addition, it was again useless to provide feedback on students' drafts and require no revisions. He commented:

During my first few years of teaching, I have spent a lot of time and effort in the provision of detailed grammatical feedback, since all my previous teachers used to do that. I remembered that as a student, when I received the feedback from the teacher, I would treat it carefully, regardless of whether a revision was required or not. However, during my five years of teaching, I realized that nowadays the students are different, I can say, they are somewhat lazier than us. So, for me, to make my feedback more efficient, I need to require them to go through my feedback, and write another draft based on what I have provided. (1st interview)

Due to the teacher's own learning and teaching experience, he firmly believed the effectiveness of multiple drafts and adopted this feedback approach in his class, which allowed me to collect data suitable for answering my research questions.

3.2 Data Sources and Collection

Over the period of the academic year from March 2023 to June 2023, the student participants took the course of *English Writing (Level 1)* taught by Teacher A. During the three months, the students learnt basic writing concepts, such as punctuation, grammar, writing genre, and basic writing structure. Especially, Teacher A focused on improving the students' argumentative writing skills, since all students prepared to take the College English Test Band 4 and College English Test Band 6, where the writing genre were mostly argumentation. Over the course, the students were assigned two untimed writing tasks.

To achieve both the validity and trustworthiness of the research, data triangulation was taken into consideration (Ayton, Tsindos & Berkovic, 2023). A variety of data sources were collected, including students' writing drafts, the teacher's written corrective feedback, stimulated recalls done by the students and semi-structure interviews with both the students and the teacher. The variety served as to validate the results and cross-check the findings, thus to ensure a more well-rounded and credible interpretation of the data.

For the students' writing drafts, since each student needed to write a first draft and a second draft based on the teacher feedback, this meant that overall, 20 (2*2*5) writing drafts were collected and analysed. In addition, the corresponding feedback was also explored to see whether the feedback type could influence students' engagement level. When the students received teacher corrective feedback on their first drafts, each student needed to make an individual appointment with the researcher for his/her revision. Then,



the student and the researcher met at the quiet tutorial room where the student started to revise his/her writing drafts. The students were allowed to bring everything they might need for revisions, such as their textbooks, their notebooks and/or laptops. After completing their revisions, the students carried out verbal reports where the researcher pointed to each instance of teacher corrective feedback, prompting the students to explain how they understand the teacher feedback, and what cognitive and metacognitive strategies they have employed during revision.

Two semi-structured interviews were carried out with Teacher A and his six students at the beginning and the end of the study. The first interview with Teacher A aimed at gathering background information regarding his teaching experience, approach to feedback, and understanding of student learning needs. This initial interview aimed to provide context for the study and explore the teacher's pedagogical methods. The second interview with Teacher B centred on his experiences with students' use of written corrective feedback during the research period, including how students typically responded to his feedback and the impact he observed on their writing revisions. It also delved into Teacher B's reflections on the effectiveness of his feedback strategies. Both interviews were conducted in a semi-structured format, allowing for in-depth exploration of each teacher's perspectives, and were audio-recorded with their consent.

As for the interviews with the students, the first interview focused on exploring the students' educational backgrounds and their prior experiences with teacher feedback. This provided the researcher with an initial understanding of the students' feedback perceptions and expectations. The second interview, conducted at the end of the study, sought to explore the students' reflections on their overall cognitive experiences with teacher feedback.

Each interview lasted for about 25 to 35 minutes and was audio-recorded with the students' consent. The students all used their first language (i.e. Chinese), to produce a more detailed and accurate expression of their thoughts. The semi-structured interview was used since it was particularly effective in exploring students' learning process (Ayton, Tsindos & Berkovic, 2023). Table 3 illustrated the timeline for data collection.

Table 3: An overall timetable for the data collection

Week	Data sources
Week 1	Getting in touch with the potential students and the teacher
Week 2	First Semi-structured interviews with both the students and the teacher
Week 6	First writing task (Students handing in their first drafts)
Week 7	1. Provision of teacher written corrective feedback 2. Submission of students' second drafts 3. Students' stimulated recalls
Week 12	Second writing task (Students handing in their first drafts)
Week 13	1. Provision of teacher written corrective feedback 2. Submission of students' second drafts 3. Students' stimulated recalls
Week 16	Second Semi-structured interviews with both the students and the teacher

3.3 Data Analysis

It has been established in previous studies that the type of corrective feedback can have an impact on students' cognitive processing levels (Fan & Xu, 2020). Accordingly, teacher feedback in the present study was categorized into direct and indirect feedback, based on Ellis' (2009) classification.

Teacher WCF, along with the students' writing drafts, underwent a careful examination, with a particular focus on the students' mental processing levels during revisions. While pointing to each feedback, the students needed to explain how they understood the teacher feedback and why they made such as revisions. This particular analysis provided valuable insights into how students interpreted and cognitively engaged with the feedback, whether they understood it at a superficial level (e.g., only noting the feedback) or at a deeper cognitive level (e.g., providing accurate metalinguistic explanations). Additionally, it also explored how different levels of mental engagement influenced the effectiveness of their revisions.

Different from prior studies done by Qi and Lapkin (2001) that only identified the students' depth of processing as either noticing or understanding, the current study discovered five types of mental processing levels: unconscious disregarding, intentional neglecting, noticing, inaccurate understanding and accurate understanding. Table 4 provided more detailed explanation on these five types of depth of processing:

**Table 4: Types of depth of processing of teacher written corrective feedback**

Depth of processing	Explanations
Subconscious disregarding	Students unconsciously forgot the make corrections according to feedback, thus leaving the feedback unattended
Intentional neglecting	Students deliberately ignored teacher feedback, thus making no revisions
Noticing	Students noticed the teacher feedback, but could not provided explanations of the feedback
Inaccurate understanding	Students provided inaccurate or partially accurate explanations of the feedback
Accurate understanding	Students provided accurate explanations of the feedback

According to the conceptual framework of cognitive engagement (i.e. Table 1), students' cognitive engagement included both the depth of processing and their mental effort in using cognitive and metacognitive strategies. Regarding the latter parts, since limited research has focused on these dimensions of cognitive engagement, the findings were grounded in the current data from semi-structured interviews and stimulated recalls. In total, 10 stimulated recalls (5 students * 2 writing tasks) and 10 interviews (5 students * 2 interviews) were conducted with the students. These data were transcribed verbatim to ensure a complete and accurate record of the participants' responses. Following transcription, the data were translated into English. The translation process was carried out with a focus on preserving the original meaning, ensuring that any cultural or linguistic nuances were appropriately conveyed in the English version (Flick, 2007).

The transcripts were carefully cross-checked by the student participants and the teacher participant to ensure that no misunderstandings or inaccuracies occurred. This step was essential to verify that the participants' responses were faithfully transcribed and that their intended meaning was accurately reflected. Any ambiguities or misinterpretations were clarified through this review, ensuring the data's reliability for further analysis (Flick, 2007).

As starter, a detailed selection process was carried out, retaining only those data segments that pertained to the different aspects of student engagement. The data were then stratified according to the three sub-dimensions of cognitive engagement (i.e. depth of processing, adaptation of cognitive strategies and adaptation of metacognitive strategies). This process of categorization was critical, as it allowed for a more precise and systematic examination of the different layers of cognitive engagement (Benson, 2013).

In the final phase of the analysis, cross-case comparisons were applied to uncover recurring or analogous themes across various cases (Benson, 2013). This comparative technique allowed the researcher to detect overarching patterns and commonalities, which were crucial for understanding the broader phenomenon of cognitive engagement with WCF.

To ensure the reliability of the data analysis, another colleague, holding a Doctorate degree in Education, was recruited as an additional coder to independently code 30% of the students' writing drafts, semi-structured interviews, and verbal reports. The initial inter-coder agreement rate was about 80%, and following two rounds of discussion to resolve discrepancies, the agreement rate was raised to 100%, thereby enhancing the validity of the coding procedure.

4.FINDINGS

According to the engagement framework, students' cognitive engagement could be understood as the students' depth of processing, their mental effort into adopting cognitive strategies, and their mental effort into utilizing metacognitive strategies (Ferris, Liu, Sinha & Senna, 2013). However, since existing studies have indicated that the types of teacher feedback may influence how students cognitively engaged with feedback (Kahu, 2013), the following section thus began by introducing the common patterns regarding the explicitness of teacher written feedback, and then was followed by a detailed explanation of the three sub-dimensions of cognitive engagement.

4.1 Number and the explicitness of teacher written corrective feedback

Regarding the number of written corrective feedback (WCF), Teacher A delivered 89 feedback points. On average, he provided 17.8 grammatical feedback to each student. As shown in Tabel 5, detailed information was provided on the number of feedback points delivered on each student's first draft.

**Table 5: WCF on two writing drafts received by each student in Chole's class**

Student	Total WCF points
Student A	18
Student B	16
Student C	19
Student D	17
Student E	19
Total	89

Regarding the explicitness of WCF, most previous studies have classified corrective feedback into two main types: direct or indirect feedback. Table 6 illustrated what did it mean by direct and indirect feedback.

Table 6: Definitions and examples of direct and indirect feedback

Feedback type	Definition
Direct feedback	Direct feedback referred to explicit corrections provided by the teacher.
Indirect feedback	Indirect feedback indicated the provision of hints or cues that guide the student to recognize and correct errors independently. Specific forms included underlining, circling and underlining with a question mark.

Agreeing with the prior findings, Teacher A also delivered these two types of corrective feedback. According to Zheng and Yu (2018), the participant teacher in their study delivered 65.22% of direct feedback and 34.78% of indirect feedback. The current study discovered that less direct feedback was delivered than that in Zheng and Yu's study. One possible reason was that in their study, they focused on low-proficiency students while the current study included intermediate students.

4.2 Students' Depth of processing

Different from previous studies that only summarizing depth of processing as noticing and understanding, the current study discovered five levels of depth of processing: unconscious disregarding, intentional neglecting, noticing, inaccurate understanding and accurate understanding.

Unconscious disregarding happened when the students admitted that she/he forgot to make corrections based on teacher WCF. For example, the teacher added "can" after the word "I" in Student B's sentence "As far as I see, it is natural understandable...". Student B commented this feedback:

Oh, I think I just did not notice it jut now. Because when I revised, I just read through my draft. Maybe I think that my original sentence (i.e. as far as I see) is quite smooth, so I hasn't paid too much attention. (2nd stimulated recall)

Comparative to this unintentional action, some students demonstrated deliberate ignoring of teacher feedback. For example, Student C commented on the following teacher's feedback:

First draft: In summarise, it is apparent that...
(WCF: In brief/In summary)

I have noticed this, but I have not made any revisions. Since I think both phrases are accurate, and the teacher just provides me an alternate choice. (1st stimulated recall)

However, when the researcher asked further question about whether he noticed the difference of spelling between "summary" and "summarise", Student C suddenly realized the error:

Oh! The word "summarise" is a verb. I think I hasn't realized this before. I am too careless! (1st stimulated recall)

So, for Student C, her demonstration of a lower level of processing was resulted from her own personality, rather than her English proficiency level, since with further questions, she could have provided accurate understanding.

In terms of accurate understanding, most students can accurately understand some of the feedback points, especially when the feedback was provided directly. Below was an example from Student D:

First draft: I think such behaviour is understandable but is not recommendable.



(WCF: repetitive, you can use “by no means”)

I think this feedback is extremely useful, since I always use this sentence pattern. However, since my prior writing teacher has not provided any feedback, I have not realized that this kind of writing is not very good. Here, the teacher feedback means that my sentence is repetitive, since there are two “is” in the sentence. Also, I think it is considerate for the teacher to provide an accurate form. (1st stimulated recall)

For Student D, direct feedback proved to be effective in helping her revision. Also, she showed accurate understanding of the feedback by indicating that what was wrong with her original draft. In addition, she also indicated that she utilized cognitive strategies for this feedback, which will be analysed in Section 4.3.

As for partial understanding, it happened when the students could only provide partial reasons for the feedback. For example, student A provided explanations on the following feedback:

First draft: Many advocate that taking holiday during the students’ semesters should be avoided, I believe it's better to include short-time holidays in the students’ semester to help them relax.

(WCF: While many advocate that taking holiday during the students’ semesters...)

Here, the teacher added “while” at the beginning of the sentence, I think it is accurate, because in my original draft, there is a comparison. I compare what others think to what I believe, so “while” should be used as an indication of different opinions. (1st stimulated recall)

However, when the researcher asked another question about whether he thought his original sentence was complete or not, he displayed uncertainty by saying “well, now I have read it again, I think it is not very fluent. The teacher’s version sounds better.”

So, based on Student A’s explanation, he understood the teacher feedback based on his writing content. However, he has not realized that his original sentence was incomplete, and that is the underlying reason why the teacher added a conjunction to his original sentence. Thus, this instance was an illustration of “inaccurate understanding”.

4.3 Students’ usage of Cognitive Strategies

In terms of cognitive strategies, it referred to the mental effort students exert to actively process, analyse, and organize information in order to enhance their understanding and retention of the material. To be specific, some of the students exhibited memorizing and reasoning as their cognitive strategies.

In fact, reasoning was closely related to the students’ depth of processing levels. When the students’ reasoning was accurate, their depth of processing levels was also higher. When the students could not provide any specific reasonings or only part of the reasonings, their depth of processing was comparatively lower.

In addition, the current study also discovered a new type of cognitive strategy, which was memorizing. For some students, they processed their teacher feedback at a deeper level, by memorizing the accurate forms. As mentioned in Section 4.2, the teacher corrected Student D’s original version from “I think such behaviour is understandable but is not recommendable” to “I think such behaviour is understandable but by no means recommendable”. After she provided accurate understanding of the grammatic rules underlying the teacher feedback, Student D kept on commenting how she would use this feedback:

I think this sentence could be used in my future writing. So, after correcting this error, I spend several seconds to memorize this phrase. I originally designed to write it down, but since I forgot to take my notebook with me, I decided to firstly memorise it. Oh, I know, I can use my phone! (Then she asked whether she can use her phone to memorize this phrase again) (1st stimulated recall)

Student D’s example was inspiring since it provided two insights. For some students, they exerted more cognitive effort in utilizing the teacher feedback, in the form of mental memorization. By committing the feedback to memory, this form of cognitive engagement allowed them to process the feedback more actively, ensuring that they retained the corrections for future reference and incorporated them into their writing practices. Secondly, while the current study centred on students’ cognitive engagement, the data revealed that sometimes cognitive engagement and behavioural engagement was interrelated. Students’ cognitive engagement, such as their mental effort in processing teacher feedback, could sometimes be observed through actions like using their phones to take notes or reviewing materials related to their feedback. This interplay between cognitive effort and observable actions underscores the complex nature of student engagement, where mental processes are often accompanied by visible behaviours.

4.4 Students’ usage of metacognitive strategies

According to Oxford (2017), metacognitive strategies could be understood as the methods or strategies students implement consciously or unconsciously for the aims of planning, monitoring and evaluating their learning and cognition. These strategies



enable learners to gain greater control over their cognitive activities, helping them assess the effectiveness of their approaches and adjust their learning strategies accordingly to enhance understanding and performance.

Previous literature has provided scant evidence regarding how students adopted metacognitive strategies in their revision processes, the current study offers promising evidence. Two types of metacognitive strategies were found from the data: planning and reviewing. Half of the students reported making plans before revisions. For example, Student C mentioned in her stimulated report:

Well, before revision, I spend several minutes on thinking about what aspects I should focus on. Then I decided to firstly revise easier errors, such as spelling and plural forms. Then I focused more on correcting the word choice problems. Student E also reported making plans before revision. However, her focus was contrary to Student E's plan, since she decided to focus more on more difficult feedback:

For me, I skim the feedback firstly and then decide to correct the feedback that has confused me first. Because I think that resolving the more complex issues first allows the remainder of my revision to proceed more smoothly. I don't want to finish my revision still grappling with feedback that I'm unsure how to address. (2nd verbal report)

As for reviewing, all the students demonstrated their engagement in this specific strategy. To be specific, all of the students reported checking their completed drafts once again before submission. However, how they reviewed varied among students. Three participants indicated that they used *Pigai*, an online writing evaluation platform, to evaluate their revised drafts.

For the other three students, two reported rereading carefully the revised drafts before submission to catch any overlooked errors, while the remaining student described reviewing her draft by simply skimming through the finished draft. This diversity in reviewing strategies reflected that even for the same metacognitive strategies, there were still different levels of engagement, which emphasized the importance to explore the students' learning process, rather than their learning outcomes.

5. DISCUSSION

The study revealed that, in addition to proficiency levels, students' personality also played a significant role in how they cognitively engaged with teacher WCF. For example, while Student C could have provided accurate understanding of a certain feedback point, she chose to ignore the feedback because she was too careless to notice the difference between teacher feedback and her own writing. This observation suggested that personality traits, such as attention to detail, may influence how students process and engage with feedback (Ellis, 2009).

Additionally, Student D's case indicated that the multiple dimensions of learner engagement was interrelated, at least at the dimensions of cognitive and behavioural. Furthermore, the students' metacognitive strategies in reviewing also indicated the interplay between cognitive and behavioural engagement (Fan & Xu, 2020). While some students reviewed their drafts by skimming the text, other students took advantage of the external resources such as online writing evaluation platform.

In addition, the same metacognitive strategy could also demonstrated different levels of engagement (Zheng & Yu, 2018). For example, when students chose to review their drafts by simply skimming, their engagement levels were lower, since this method required less cognition. Comparatively, when students demonstrated their attempt to look for external resources to help their reviewing, it indicated a higher level of metacognitive levels.

6. CONCLUSION

The current multiple case studies explored how intermediate university students engaged cognitively with teacher written corrective feedback. In sum, each student engaged with WCF among the three sub-dimensions of cognitive engagement, namely the depth of processing, the adaptation of cognitive strategies, and the utilization of metacognitive strategies (Kahu, 2013). In terms of the depth of processing, five levels of depth of processing were identified: unconscious disregarding, intentional neglecting, noticing, inaccurate understanding and accurate understanding. The current study found that even for some of the direct feedback, students might still intentionally or unintentionally ignore them. In addition, even the focus of the study was intermediate students, it showed that all of them acquired certain English knowledge, since all of them could provide metalinguistic reasons for certain feedback points.

Regarding the adaptation of cognitive strategies, evidence showed that some students adopted memorizing and reasoning as their cognitive engagement. To be specific, some students devoted mental effort into committing several feedback points to memory, in case the feedback could be suitable for future usages. The study contributed to the current research by discovering that students also adopted metacognitive strategies during their revisions.

Specifically, planning and reviewing were the two main metacognitive operations. For some students, they did not just jump into



reviewing their drafts upon receiving teacher feedback. Yet, they paused for some minutes to make plans, in order to decide what kind of errors they should priorities in their revision. This differed from the findings from Zheng and Yu (2018), which reported limited metacognitive strategies among their students. One of the possible reasons were the students' proficiency levels. Since the current study recruited intermediate rather than low-proficiency students, they might have more learning experience and cognition span when processing feedback, thus it allowed more room for cognitive operations (Ferris, 2010).

One of the limitations of the study were that it only included a research period of three months. This shorter research period made it difficult to detect whether there are any changes in the engagement levels. In addition, the current study has already proved that students' proficiency levels could influence their engagement levels. Thus, future research could be conducted within a longer research period and include students with different English proficiency levels.

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THE APPLICATION OF SCHEMA THEORY IN COMPREHENSIVE ENGLISH READING TEACHING FROM THE OBE PERSPECTIVE

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ABSTRACT

The outcome-based-education (OBE) educational philosophy aims to achieve results and puts students first. It is an educational philosophy that adopts a reverse thinking approach to the curriculum system. Schema is a knowledge structure that exists in memory. The effective activation of schemata can stimulate learners' enthusiasm and initiative. Teachers apply schema theory to guide comprehensive English reading teaching, which plays an important role in assisting students in constructing, activating, and improving language schemata, content schemata, and formal schemata.

KEYWORDS: OBE; Schema Theory; Comprehensive English Reading

I. INTRODUCTION

According to the revised 2023 edition of the requirements of the talent cultivation plan of the School of Foreign Studies at Zhaoqing University, the English major should focus on cultivating high moral standards, willingness to teach, solid knowledge of English subjects, familiarity with Chinese and foreign cultural knowledge, good English application ability, strong English teaching ability, and certain teaching and research ability, as well as cross-cultural ability, self-learning ability, critical thinking ability, and innovative consciousness. OBE (Outcome Based Education) educational philosophy^[1] aims to achieve results and puts students first. It emphasizes that the allocation of educational resources and all teaching activities (including teaching design, teaching steps, and teaching reflection) should closely focus on students' expected learning outcomes and ability development, reflecting students' subjectivity and teachers' leadership.

According to the spirit of the *National Medium - and Long Term Education Reform and Development Plan Outline (2010-2020)* and *Several Opinions on Improving the Quality of Higher Education in an All round Way*, the comprehensive English curriculum should aim to cultivate students' comprehensive training in five skills: listening, speaking, reading, writing, and translation. The overall task is to enhance students' humanistic literacy and comprehensive quality, so that students can establish correct values and improve their cross-cultural communication skills in the process of understanding themselves, others, and the world. College comprehensive English courses should take the guidance of the OBE concept as an opportunity to fully mobilize students' enthusiasm and initiative in learning English, and improve their basic language skills such as listening, speaking, reading, writing, and translation through the correct use of schema theory.

The author found many problems in various aspects such as listening, speaking, reading, writing, and translation in the comprehensive English course through auditing and personal teaching practice. Firstly, students' listening ability is insufficient, and they feel scared when talking about "listening"; In the preparation work required for students to give presentations on a certain topic with the aim of improving their English speaking skills, some students are not well prepared or even do not prepare, resulting in classroom oral presentations becoming rote reading of PPT; The preview of Reading I has basically become a vocabulary and grammar lesson. Although students have made a lot of annotations and marks in the book, they only stay at a low-level reading level of words and sentences. They have not formed a complete framework for the overall structure or paragraph logic of the article, nor have they done a good job in accumulating cultural background knowledge; There hasn't been much progress in English writing. Some students don't make drafts at all and write essays like a journal, while others may have a brief outline but use stiff and awkward vocabulary, make grammar errors, and logically confused sentences, let alone use rhetorical devices; In terms of translation, even if the translation instruction is from Chinese to English, due to the lack of Chinese knowledge and background of the translator (the native speaker of Chinese), the principle of "faithfulness" cannot be satisfied. Meeting the demands of "expressiveness" and "elegance" in translating will be an empty talk. The above-mentioned issues are not isolated cases, and need to be addressed urgently. The article hopes to draw on schema theory to improve the teaching status of comprehensive English.



II SCHEMA THEORY AND LITERATURE REVIEW

The concept of schema ^[2] can be traced back to Plato and Aristotle, but Kant ^[3] is generally considered the first person to define schema as an "organizational structure" that regulates how we view and interpret the world ^[4]. The research on memory by British experimental psychologist Bartlett^[5] in the 1930s is considered a classic case on which schema theory is based. He believes that schema is a way for people to understand the world, and schema is an active organizational function of experience or knowledge, which must be an abstract system formed by the integration of individual elements, rather than simply listing them. Piaget ^[6] introduced schemas into the field of psychology to study cognitive development in children "Development is explained as a continuous dialectics, in which an individual either absorbs new experiences consistent with existing schemata, or adapts schemata to his or her experiences." Piaget explained the process of schema construction in children's cognitive world using schema, assimilation, adaptation, and balance. Simply put, in order to acquire new knowledge and grow, organisms must balance adaptation and assimilation. Assimilation maintains the integrity of existing schema structures by integrating or transferring new information to old schemata (schemata undergo quantitative changes); Conformity is the adjustment made by organisms to adapt to new environments by creating new patterns or changing the structure of existing patterns (qualitative change). In the process of children's development (acquiring new knowledge), if there is only assimilation without adaptation, it will lead to an imbalance between assimilation and adaptation, and there will be no new schema generated, which will result in the inability to complete the task of development; Another danger is that when there are errors in the existing schema and the organism only adopts assimilation strategies in the process of interacting with the external world, the existing schema will repeatedly make mistakes, causing irreversible situations. If one only adapts to differentiation and constantly constructs countless schemata without systematically summarizing and generalizing the characteristics of the object, these schemata will become scattered and disorderly piles, which will also cause trouble for the organism and prevent it from obtaining true meaning of "development". In the 1980s, American AI expert Rumelhart ^[7] and others supplemented the previous schema theory and defined schema as "a group of 'interacting knowledge structures' stored in long-term memory in hierarchical form". Piaget and Rumelhart et al. summarized that the basic characteristics of schemata are: the presence of variables; Internesting between schemata; Schema representation of knowledge at all levels of abstraction; Schema is an active cognitive structure. Rumelhart ^[7] also introduced schema theory into reading instruction. He divided schemata into language schema, content schema, and form schema. If students are familiar with the thematic content and cultural background knowledge of the text they are reading, they possess a content schema; If students understand the genre characteristics of the text, the logical framework between paragraphs, and the overall structure, they will possess formal schema; If students are proficient in vocabulary, sentences, grammar, rhetoric, and other knowledge in the text, they will have language schema. In this way, students are "innate" prepared to better understand the reading content. The absence of any of the above schemata will lead to reading comprehension defects. Carrell ^[8] believes that "students' apparent reading problems may be due to insufficient background knowledge [content, form, and language], and even if students may have sufficient schemata, they may still be unable to understand the text if these schemata are not activated. Of course, even under the condition of schema activation, Aebersell&Field ^[9:41] cautioned that "if the topic... exceeds [students'] experience or knowledge base, they will drift in the unknown ocean". This poses new challenges for universities in terms of professional settings, curriculum reform, discipline construction, and textbook selection, as well as for frontline teachers in terms of lesson preparation, student preparation, self preparation, classroom explanation, homework assignment, and assessment evaluation. Teachers should optimize learning content (stimuli) as much as possible based on a comprehensive understanding of students' knowledge backgrounds, in order to better activate students' existing schemata, achieve a balance between existing schema and stimuli in the interactive dynamics of assimilation and adaptation, and help students complete the task of acquiring new knowledge.

The research on schema theory in China began in the 1980s. After searching for the topic of "schema theory" on the CNKI (China National Knowledge Infrastructure) platform, 9273 results were found. The earliest article was Chapter 5 of *Elementary Psychology* by Holland-an American author, translated by Shaji WuJie in 1983 and titled *A Theory of Learning*. To obtain the literature on using schema theory to guide foreign language teaching in China, more efforts were put in such as inputting "schema theory+foreign language teaching" in the topic column and 1417 results were found. Among them, the earliest application of schema theory to foreign language teaching was *Schema Theory and Foreign Language Reading Teaching* by Lou Lijun, which was published in the Journal of Shantou University in 1993. In order to narrow down the search scope, the input content—"Schema Theory+Foreign Language Teaching" in the topic bar remains unchanged. In the source category, after clicking and picking CSSCI, CSCD, and AMI, and only 70 results were found. The following text provides a brief review of the literature on schema theory in core journals. Zheng Jing ^[10] studied first-year students majoring in English and non-English at two universities in Shanghai, and based on reading training experiments, concluded that if teachers engage in more reading training activities that activate schemata, students' schema storage, extraction, and processing abilities can be improved. Yang Yuan and Xu Bing ^[11] verified the effectiveness of schema theory and task-based teaching method through teaching experiments, indicating that schema theory is applicable to Japanese reading teaching and helps improve students' reading comprehension ability and language logical thinking ability. Yang Yang ^[12] takes Vietnamese translation teaching practice as an example and proposes the necessity of combining language schema, formal schema, content schema, and cultural schema in translation teaching activities to enhance the translation ability of non lingua-franca learners in universities. Liu Fengxiang ^[13] and Zhang Yanyan ^[14] applied schema theory to oral training, demonstrating the feasibility and effectiveness of schema theory in improving English oral training, and providing relevant strategies for teaching practice. Long



Zaibo and Wang Yuqi^[15] introduced schema theory into independent college English listening teaching, and verified the effectiveness of schema theory through experimental sample analysis. They proposed a "six-step teaching model" for independent college English listening. Lv Peichen^[16] reiterated the importance of schema theory in foreign language teaching practice. Teachers should start from the perspective of activating, enriching, and constructing new cultural schemata to help students improve their listening comprehension and reduce listening barriers. Ma Yumei^[17] starts from a micro perspective and focuses on English vocabulary teaching in language schema theory, improving the efficiency of foreign language vocabulary teaching by establishing various connections. The application research of schema theory is not limited to the higher education stage, and there are also studies on the guiding significance of schema theory in middle school English reading and writing in the basic education stage^{[18] [19] [20]}.

After a brief literature review of domestic core journal literature, the following points can be drawn: firstly, although the history of applying schema theory to foreign language teaching practice in China is only about 30 years, the research scope is wide and the field is broad. In terms of curriculum, most of the research focuses on the application of schema theory in foreign language reading teaching, and some articles also discuss the teaching guidance significance of schema theory for foreign language listening, speaking, and writing. In terms of language, schema theory is mainly applied to the study of English language, but it does not exclude the study of minor languages such as Japanese and Vietnamese; Secondly, there are still limited articles on the application of core schema theory in foreign language teaching practice, and there is still a lot of room for exploration. Among the 1417 articles on foreign language teaching explored under the theme of "schema theory+foreign language teaching", core journals only account for about 5%.

III APPLICATION AND EXPLORATION OF SCHEMA THEORY IN COMPREHENSIVE ENGLISH COURSE

The comprehensive English course of the English major at Zhaoqing University applies the newly compiled English curriculum edited by Mei Deming^[21]. The layout of each unit in the second volume of the student book is composed of six parts, namely, language structure, dialogue, listening in & speaking out, Reading I & Reading II, guided writing, interaction activities. This includes training in basic language skills such as listening, speaking, reading, and writing. The compilation of textbooks follows the following five principles. One is the principle of integrating language knowledge, language skills, emotional attitudes, learning strategies, and cultural awareness; The second principle is to use language and content that conform to the cognitive laws of college students and stimulate their interest in learning; Thirdly, importance is attached to the perception and experience of language knowledge, the acquisition and processing of language information, the coordination of input and output, and the reasonable reflection of the reproduction rate of language knowledge. Fourthly, rich cultural content from both Chinese and foreign cultures is provided to cultivate students' cross-cultural communication skills. Lastly, in terms of material selection, there is a wide range of genres, with humanities and social sciences as the main focus, and natural sciences as a supplement. The proportion of novels, poems, essays, biographies, etc. is balanced. Taking the reading section of Unit 6 in Comprehensive English Volume 2 as an example, this paper explores the practical application of content schema, structural schema, and language schema in the comprehensive English curriculum, focusing on the listening, speaking, reading, and writing aspects of the five principles and unit layout mentioned above.

1. Schema Construction in the Pre-Reading Section

The pre-reading section prepares a schema for formal reading. The reading material for this unit is A Virtue Called Devotion. The teacher guides students to understand that the topic of the text is Virtue Devotion through the interpretation of the topic; visually seeing the word 'devotion' can activate the existing conceptual and categorical schemata of the mind towards the word 'devotion'. Is it 'loyalty' or 'dedication'? Is it a romantic relationship, a family relationship, a career, a nation, or even a religion? Schema, as a cognitive structure, can guide the behavior of the subject. Students can identify their differences by consulting materials, making schema concepts clearer. At the same time, through assimilation, they can integrate the acquired new knowledge into existing schemata, making the content of existing schemata richer and more complete. It is also possible to activate situational schemata and generate expectations for new knowledge, such as recalling whether one has previously studied articles on similar topics. Next, consider a question - 'What might I read?' to further speculate on the content of the article. Is it to help readers interpret the meaning of "devotion" or to use examples to tell a story to help readers understand the true meaning of a specific devotion category?! Students can even expect the genre of the text to be expository, narrative, or argumentative?!

Teachers can guide students to construct content and structural schemata based on post-class questions. The first post-class question in Lesson A Virtue Called Motivation is "In what physical condition is the writer's grandmother?" It can be inferred that the answer to this question is related to physical condition. Students can name it as Content Schema 1: Physical Condition of Grandmother. Since the second question is "Why can the writer's family hard put up with Grandmother?", it can be inferred that this question revolves around "causal relationships - the reasons why family members cannot tolerate their grandmother". It can be named Content Schema 2: Reason. Following this line of thinking, the third content schema, the fourth content schema, and so on can be derived. Actually, the eight questions after class revolve around what, why, and how. What refers to the physical and mental condition of the grandmother and issues with the nursing home (questions 1, 3, and 4), the decisions made by the mother (question 5), and the author's views on caring for the elderly (question 7) (question 8 is an open-ended question). The "Why" question refers to the reason



why family members cannot tolerate their grandmother (question 2). "How" refers to how different societies treat the elderly differently (Question 6). What, why, and how can be connected together to form the framework structure of the entire problem. Both structural and content schemata have been formed.

Common sense tells us that objects with obvious features are more likely to be noticed by organisms, and therefore more likely to be remembered by organisms and stored in the brain to form patterns. For example, students with more movements are more likely to attract the teacher's attention in class; Colored text is more likely to attract readers' attention than other mundane text. During the language schema creation stage, teachers can guide students to consciously pay attention to whether the reading material includes photos, maps, or charts? Is there a list of key terms and definitions? Are there any important words in bold, italic, or underlined? The first to sixth paragraphs of text A Virtue Called Devotion all contain content marked in blue font. There are ten words marked with superscripts in the upper right corner from the first to the sixth paragraph, and some words (her and my in the fourth paragraph) are written in italics. These words and sentences with obvious special processing methods are the key and difficult knowledge points that need to be paid attention to when interpreting the text. The words 'put up with' and 'live with' in blue font in the first paragraph are a group of synonyms; The words 'room' in the second paragraph, 'divorced' in the third paragraph, and 'heartless' in the fifth paragraph are all new vocabulary that needs to be mastered; words of "inexpensive" and "unappealing" are knowledge points that carry negative prefixes; The sentence structure in the blue font in the fourth paragraph is very symmetrical, consisting of a subject plus predicate plus adverbial (SVA) structure. The symmetry of the structure can better serve as a contrast in semantics. Faced with the fact that my grandmother needs to be taken care of in her old age, other family members are deliberately avoiding the obligation to support the elderly, while my mother is different and actively proposes to take on the responsibility of supporting my grandmother.

The establishment of the above structural schema, content schema, and language schema provides conditions for the effective development of formal reading. Each constructed schema acts as a bridge connecting the organism and external stimuli (people, events, environment, etc.). In reading activities, when the schema is activated, the organism's reading comprehension will be smoother and knowledge acquisition will become possible.

2. Schema Activation in Text Reading

After creating the schema, it is necessary to activate the schema. Carrell^[22] (1981) argues that "All valid cognitive schemata of the reader must be activated in order for the text to be understood." Firstly, from the perspective of lexical schemata, the article mentions that the grandmother's age is ninety-four. If a student is a vocabulary sensitive learner and sees the word 'ninety-four', 'the reader's visual schema will be immediately activated, and reading comprehension is a process of interaction between various levels of schemata^[25]. After the visual feature schema is activated, it will automatically activate language schema such as words, semantics, grammar, and strategic schema for vocabulary memory. The understanding of strategic approaches to problem-solving through strategic schemata is about the psychological structure of achieving specific goals or outcomes, including cognitive patterns for selecting and implementing behavioral strategies. These schemata influence our decision-making and behavioral choices. Under the guidance of strategic schemata, students will consciously search for age-related vocabulary. Ninety four is a term selected by students, and the implemented strategy can be associative strategy. Students associate the professional terms for different age groups in Chinese, namely 六十花甲, 七十古稀, 八十耄耋, 九十鲐背, 期颐之年. Students find their corresponding English words under the guidance of the strategic schema, namely: sexagenarian, septuagenarian, octogenarian, nonagenarian, and centenarian. By activating the strategic schema, searching for vocabulary, and a series of cognitive activities and behaviors, the subject further enriches its vocabulary schema, improves its knowledge structure, and achieves twice the result with half the effort. This strategy is also applicable to the learning and consolidation of grammar knowledge points. The last two sentences of this paragraph are about the grammar knowledge points of adverbial clauses of result, which can activate students' schema of other adverbial clauses. The memorization and mastery of clauses such as adverbial clause of time, adverbial clause of place, adverbial clause of reason, adverbial clause of comparison, adverbial clause of manner, adverbial clause of concession, etc., is indeed one of the compulsory contents in the junior grades of English majors. The first paragraph of Text A Virtue Called Devotion introduces the grandmother's age and physical condition with significant hearing loss. By using two symmetrical and parallel subordinate compound sentences, the changes in the grandmother's thoughts and mentality after aging are highlighted, and the reader's impression of the characteristics of grandmother's aging is deepened: grandma has become demanding and pessimistic due to ageing. This structure can also activate existing schema structures related to the construction of balanced sentences.

The topic of the text (new stimulus) is respecting and loving the elderly. In the Chinese context, Chinese students are naturally familiar with the traditional Chinese virtue of respecting the elderly and loving the young, that is, their existing schema is the cognition of "respecting the elderly and loving the young". Due to the strong correlation between reading materials and existing schemata, existing schemata are easily activated. Under the premise of activating existing schemata, students only need to adopt assimilation strategies, that is, integrating new knowledge (specific information elements) into existing schemata. Existing schemata are richer in content, and students can complete the learning and understanding of new knowledge.

According to experience (existing patterns), the topic sentence is usually located at the beginning or end of each paragraph. Students guide their behavior based on existing schemata by identifying the central sentence of each paragraph to infer its general meaning.



However, this practice is just a general rule without considering exceptional cases. Because some topic sentences appear explicitly or implicitly in the sentence, students need to summarize and refine them. For example, the first sentences of the fourth and fifth paragraphs are the central sentences of their respective paragraphs, which are "Grandma would not end up in a nursing home." and "In many lands, the elderly are treated respectfully as the head of the household." The last part is a story told by the mother, with the aim of conveying the importance of filial piety through words and deeds. And this gist does not appear directly at the beginning of the paragraph or as a summary at the end, but requires readers to summarize and generalize by themselves. In this case, there are two situations: one is to change the structure of the existing schema to reconstruct a new one, and the other is to keep the existing schema unchanged and reconstruct a completely new schema. Both of these situations involve the process of existing schemata adapting to new knowledge.

3. Perfection of the Schema after Reading the Text

After schema activation, there is an interactive process with new information. When an existing schema undergoes structural changes based on new information, which is a process of accommodation. However, in other cases, assimilation occurs, during which the existing knowledge influences new information to better adapt to our existing information, thereby reducing the likelihood of schema changes [26]. Whether it is adaptation or assimilation, it is not the end of the subject's understanding of the world, but rather a process of mutual adjustment and adaptation between existing schemata and new knowledge. In this process, the content of the schema is constantly enriched and improved, laying the foundation for the next cognitive activity. The reading schema includes language schema, content schema, and structural schema, which can be consolidated and improved after class. Teachers can assign homework after class to consolidate language knowledge points. The questions of vocabulary match and word explanation in English are nothing less than good exercises. By doing exercises, the understanding and application of word meanings are more thorough and strengthened, and language patterns are enhanced. The vocabulary questions in the workbook are designed for this purpose. Of course, there are various types of reading materials, and in order to quickly activate the patterns in memory while reading, it is necessary to read a large number of articles of different genres and contents. If students feel interested in political events, the Washington Post and NY Times are two good picks. CNBC and Wall Street Journal provide finance news. Essays, expository texts, and narrative texts should be read, as well as novels, science fiction, and technology related articles. The wider the field of exploration, the easier it is to activate existing patterns and achieve proficiency when reading. Otherwise, even if there are existing schemata, due to unfamiliarity with the content or genre of the reading material, the schema cannot be activated, and reading comprehension will be greatly compromised, resulting in twice the effort and half the result.

IV SUMMARY

Schema theory breaks with the tradition of passive teaching reading articles first and then finding answers. By creating schemata before reading, it creates conditions for students to activate schemata during formal reading, allowing them to read the text with purpose and achieve efficient reading. Schema theory has played an important role in fully mobilizing students' initiative in autonomous reading, reflecting the concept of "prioritizing students guided by instructors". Learning goals are more clear, and learning strategies are more targeted. Schema theory is a concrete application of the OBE concept, which enables students to have a basic grasp of the framework, main idea, and key and difficult knowledge of an article, preparing them for formal reading. At present, schema theory is mainly applied in higher education, and there is still much room for exploration in its guiding significance for primary and secondary education. This article takes the text A Virtue Called Devotion as an example, combined with the author's teaching practice, to explore the feasibility of the OBE theory in the reading section of Comprehensive English courses. Undeniably, schema theory also has its limitations. For example, countries where English is the native language already have inherent advantages in language schema, so when reading texts, the focus should be on activating content schema and structural schema. While in China, English is not the native language for students, and language schema, content schema, and structural schema are equally important. Moreover, students' language foundations vary greatly, and the importance and urgency of the three schemata need to be analyzed on a case by case basis, rather than being generalized.

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METONYMY AND RHETORICAL DECONSTRUCTION OF TEXTUAL MEANING IN "THE SOUND OF SILENCE"

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ABSTRACT

"The way of sound aligns with governance", Paul Simon's classic song "The Sound of Silence" is regarded as both a "song of alienation" and a zeitgeist overture. Through rich rhetorical devices, the lyrics achieve semantic displacement and unconventional combinations, creating poetic beauty through deviation while triggering listeners/readers to engage in figurative reasoning about the deeper meaning within the lyrics, thereby experiencing implicit aesthetic pleasure and the joy of contemplative understanding. This paper chooses to deconstruct, from the perspectives of cultural and religious metonymy, how the lyrics artistically achieve cognitive reference to the American counter-culture movement of the early 1960s from within the discourse. Through rhetorical reading, literary texts can deconstruct themselves. Meanwhile, due to different contexts, metonymic references will be altered in a chain of signification, making the interpretation of the textual meaning in "The Sound of Silence" inevitably indeterminate.

KEYWORDS: Metonymy, Rhetorical Reading, The Sound of Silence, Figurative Language, Deconstruction

1. INTRODUCTION

Emily Dickinson once said, "Tell all the truth but tell it slant." Many immortal poems have endured through time because poets skillfully employed literary techniques to express their ideological content. As a "song of alienation" and temporal prophecy, "The Sound of Silence" uses rich rhetorical devices, creating numerous instances of semantic displacement and unconventional combinations that generate poetic aesthetic pleasure through deviation while triggering listeners/readers to engage in figurative interpretation of the lyrics' meaning.

Current discussions of the meaning of "The Sound of Silence" mostly explore it in conjunction with the narrative plot of *The Graduate*, where it serves as a soundtrack, and these discussions tend to be impressionistic. The sole exception is Habeeb (2016), who examined the metaphorical rhetoric of the lyrics from a cognitive poetics perspective. This paper approaches through metonymy (also called metonymic rhetoric), based on bodily experience and causal adjacency associations, analyzing from cultural and religious metonymic perspectives how the lyrical text artistically achieves cognitive reference to the American counter-culture movement of the early 1960s from within the discourse. "The Sound of Silence" was released in 1964, during a time of profound social and political change in America. In the early 1960s, America was in the tense atmosphere of the Cold War, with domestic political and cultural environments also full of turmoil and conflict. During this period, the anti-war movement, civil rights movement, and youth culture uprising in American society gradually formed a challenge to traditional authority and mainstream culture. Against this background, Paul Simon's lyrics in "The Sound of Silence" touched upon both the absurdity and indifference of social reality while presenting the enormous tension between individuals and society, tradition and modernity. Through skillful rhetorical usage, the lyrics interweave the predicaments of the era, spiritual loss, and yearning for the future, thereby evoking profound resonance among listeners. In this process, metonymic rhetoric in the lyrics becomes particularly important, as it generates multiple meanings through breaking conventional linguistic contexts, not only reflecting social and cultural alienation phenomena but also embodying the deep functions of cultural and religious metonymy in the lyrics (Feng, 2023).

From a rhetorical perspective, "The Sound of Silence" is a typical artistic masterpiece of figurative language use. As a popular song, it is not merely a presentation of melody but a combination of language and emotion, possessing multiple attributes of literary works. Unlike common narrative lyrics, "The Sound of Silence" conveys criticism and reflection on social phenomena of the time through complex metaphors, metonymy, and other rhetorical devices. For example, the "silence" in the lyrics does not simply denote the absence of sound but serves as a profound metaphor for the prevalent state of "silence" and "indifference" in society, revealing the alienation



and barriers in modern social relationships. Furthermore, imagery like "neon light" and "one-dimensional man" in the lyrics not only expresses criticism of consumerist culture but also presents deep insights into social alienation phenomena. Through rhetorical reading, the multi-layered meanings of the lyrics are revealed, allowing readers to perceive not only the semantic displacement at the textual level but also to experience the rich sociocultural connotations and historical background through subtle figurative reasoning.

Metonymy represents an incidental (cancelable) inferential relationship between source and target domains within the same conceptual framework. Understanding metonymy requires inferential ability triggered by situational context clues (inferring the speaker's beliefs or intentions) and linguistic context.

Reasoning typically includes three types: deduction, induction, and abduction. Metonymic reasoning belongs to abduction. Metonymy serves as a resolution strategy for semantic-pragmatic conflicts between a linguistic unit and its context. When the literal meaning of certain linguistic expressions doesn't fully fit the local or broader background of the text or dialogue, metonymy (like other figures of speech) is triggered. This inconsistency between linguistic units and context produces a novel effect, which is resolved by giving the inconsistent discourse unit a new interpretation (new target meaning). Metonymy provides potential for language play.

2. RHETORICAL FEATURES IN THE LYRICS

"The way of sound aligns with governance" (from pre-Qin *Zuo Zhuan*), suggesting that a nation or culture's musical forms and content are closely related to its domestic politics, social development, and people's living conditions. Previously, scholars only discussed the influence of songs on culture, society, and politics, without elevating song lyrics to the status of literary research objects. Charlotte Pence's edited volume *The Poetics of American Song Lyrics* (2011) pioneered this approach, using Anglo-American New Criticism's structuralist reading method to conduct close reading of American popular song texts. Adam Bradley's *The Poetry of Pop* (2017) adopts a rhetorical reading perspective, pointing out that lyrics are both an art of emotion and rhetoric. The author explored the moderate defamiliarization effects of simile, metaphor, metonymy, synecdoche, euphemism, repetition, and other figures of speech in American popular lyrics, noting that rhetoric lurks within the song, with its aesthetic effects only becoming apparent when listeners repeatedly recall lyrics or conduct close reading of printed lyrics. Rhetoric implies figurative meaning, triggering interpretative behavior in listeners/readers and producing the aesthetic pleasure of contemplative understanding.

3. RHETORICAL FIGURATIVE ANALYSIS OF LYRICAL TEXT - FOCUSING ON METONYMY

When poets create poetry, they make everyday language meanings alienated and transformed, placing linguistically opposing or even conflicting language together, thereby generating poetic qualities through the collision of language and the interweaving of opposing meanings.

3.1 Song Title Analysis: The Sounds of Silence

The words "Sound" and "Silence" employ alliteration, creating euphony while maintaining semantic conflict. "Sounds" refers to a series of sounds or multiple sounds, while "Silence" has two meanings: a period without any sound and a state of no speaking. This can generate metonymic reasoning: sounds metonymically represent people who can make sounds, through the "property for category" adjacency metonymy reasoning, "sounds of silence" metonymically represents the silent, compliant masses.

First Verse Analysis

"Hello darkness, my old friend, I've come to talk with you again.
Because a vision softly creeping, Left its seeds while I was sleeping,
And the vision that was planted in my brain, still remains,
Within the sound of silence."

Darkness typically associates with death, but the lyrics' opening line addresses darkness as an old friend for conversation, employing personification metaphor, creating an intimate feeling. Self-talk is typical behavior when people feel lonely, and replacing psychological activities that drive action with action itself is metonymy. The first line describes the author's loneliness. In the second line, "creep" means to crawl or refers to vine-like plant spreading. The author uses vocabulary discussing plant growth, root spreading, seeding, and soil rooting to describe the persistence of vision (dreams). Using words discussing aspects of one concept to discuss another concept represents typical structural metaphor (VISIONS ARE PLANTS). Meanwhile, in Christian culture, "vision" also carries meanings of divine manifestation or apparition. Christianity views dreams as divine revelation or prophecy. In various prophetic holy books like *Genesis*, *Ecclesiastes*, *Esther*, and *Job*, dream activities are described as receiving God's revelation and understanding His interpretation of His people's living environment. People suppress their ability to receive divine oracle due to self or consciousness degradation and



numbness. "Vision" can simultaneously be interpreted as reverse metonymic reference to the living environment of the early 1960s, suggesting the degradation and numbness of social people.

Second Verse Analysis

"In restless dreams, I walked alone, Narrow streets of cobblestone
'Neath the halo of a street lamp
I turn my collar to the cold and damp
When my eyes were stabbed by the flash of a neon light
That split the night, And touched the sound of silence"

In this verse, "dreams" metonymically refers back to "vision" from the first verse. The subsequent objective scene description aims to convey subjective emotions (Eliot's objective correlative theory). "Deep night, lonely lamp" in poetry often subtly reveals the poet's solitude and loneliness. Here, "walking alone on narrow cobblestone streets, standing under a dim street lamp" achieves the same effect. "Halo" besides indicating light rings, in Christianity also represents saints' halos. Between loneliness and cold exists not only metaphor (as in cold glances, coldness) but also real psychological connection. When one feels isolated and lonely, the surrounding environment becomes increasingly cold, and low temperature intensifies the sense of loneliness. "Turning up my collar against cold and damp" as an external action metonymically represents the author's lonely and alienated inner state, further deconstructing the inner emotions conveyed by the previous verse's scene description.

The appearance of neon explains the author's sense of alienation. Neon light is artificial, non-natural light. As a typical symbol of commercial society and technological society, neon is a common image in Anglo-American literary works. Since 1912, when the first neon advertising sign lit up Paris streets, the "neon" image has continuously appeared in literary works and lyrics, such as songs like *The Neon Bible*, *The Neon Wilderness*, *The Neon Jungle*, *Neon Rain*. The U.S. National Library's music collection contains 77 songs with "neon" in their titles. Neon not only represents "consumerism and modern industrial technology" but has also become a symbol of Western civilization's degradation. Historian Andreas Bernard points out that technological development carries an aura of alienation, serving as a disconcerting force. Social scientist Lauren Langman (1992) metaphorically describes shopping malls as "neon cages" and "techno-fascism" indicating how consumerist society controls people's time, behavior, and subjectivity. Accordingly, neon here can generate multiple metonymic interpretations: neon --- technology-dominated industrialized society --- force of alienation and alienation. While "stab" (pain, an uncomfortable light), "flash", "split the night" and "touch the sound of silence" superficially describe neon light's intensity, they metaphorically represent the strong control of industrialized society over people.

Third Verse Analysis

"And in the naked light I saw
Ten thousand people maybe more
People writing songs that voices never shared
No one dared
Disturb the sound of silence"

Naked light metonymically refers back to the neon light from above, indicating the light's intensity. People under naked light metaphorically represents people living in advanced capitalist society. "Talking" refers to informal casual chat, while "speaking" refers to serious formal speech. Similarly, "hearing" means "unconscious listening" while "listening" means "conscious listening" with implications of seeking understanding. This can be translated as "speaking without heart" and "hearing without intention" superficially interpreted as people lacking communication. Contemporary Marcuse (1964) in *One-Dimensional Man* points out that advanced capitalist industrial society has become a one-dimensional rather than multi-dimensional society. One-dimensional means society has only one voice, one thought, without opposing voices. A normal democratic society should be multi-dimensional. Advanced capitalist society creates one-dimensional people. It is a totalitarian society, suppressing different opinions and voices, suppressing people's negation and criticism of the status quo. The direct cause of one-dimensional society is scientific and technological progress. The third verse's lyrics can be metonymically interpreted as the author's indirect writing about "one-dimensional man." One-dimensional people are those who lack critical spirit toward society and merely identify with reality. Industrial society's development, while greatly facilitating modern people's lives, also constrains human free development, materializes human relationships, and humans become enslaved by their own creations. People are afraid to reveal their true selves to the world.



Fourth Verse Analysis

"'Fools,' said I, 'you do not know
Silence like a cancer grows
Hear my words that I might teach you
Take my arms that I might reach you'
But my words like silent raindrops fell
And echoed in the wells of silence"

The fourth verse's theme is the author's disappointment and frustration with people's willingness to degrade. Contemporary lyric writing often took an admonishing, awakening tone. Silence growing like cancer is a simile, with cancer implying death. In Western cultural context, caves signify degradation and falling. The theme of degradation reflects in approaching death, falling into hell. Wells in the lyrics are like caves, with raindrops metaphorically representing the author's weakness relative to the masses. Wells must be deep to produce echoes when raindrops fall into well water. Depth belongs to spatial orientation metaphor, often used to metaphorically represent lonely, depressed mental states. Wells remind one of stagnant water. Water is the most basic and important image in Western culture and literature.

Fifth Verse Analysis

"And the people bowed and prayed, To the neon god they made
And the sign flashed out its warning, In the words that it was forming
And the sign said: 'The words of the prophets are written on the subway walls
And tenement halls
And whispered in the sound of silence"

Truth and idol worship are incompatible. Bowing, bending, kneeling are idol-worshipping behaviors; the golden calf (referring to abandoning principles for material benefits or worshipping money) comes from *Exodus* in the Old Testament; neon has been metaphorically elevated to god. The first line metonymically represents people's materialism. The structure of handwriting on walls: "prophets' words written on subway walls and tenement walls" serves as cautionary words; graffiti on subway walls often reveals dissatisfaction with society; graffiti creators are victims who cannot adapt to technological industrial society, structural unemployment. Here, it shows the universal emotions of this generation of college students; reveals the truth about the so-called "beautiful society".

4. CONCLUSION

Through analysis of metonymic rhetoric in "The Sound of Silence" lyrics, this study deeply explores how the American counter-culture movement of the early 1960s is embodied through rhetorical means in the lyrics. From cultural and religious metonymic perspectives, we find that Paul Simon skillfully employed various rhetorical devices, especially metonymy, successfully combining the surface meaning of lyrics with deeper social criticism and cultural reflection. Every sentence and image in the lyrics not only conveys the singer's emotions but also, through metonymy, stimulates listeners or readers to profoundly think about American society, politics, and cultural status.

In the analysis process, we first focused on the metonymic effect of the song title "The Sound of Silence" itself. Through the seemingly contradictory concepts of "sound" and "silence" the lyrics reflect criticism of social masses' silence and compliance. Here "sound" not only represents individuals who can make sound but symbolizes the silent and voiceless masses; while "silence" through its deep metaphor reveals people's powerless resistance to power and knowledge in technology-dominated consumer society, forming suppression of individual freedom and thought. This metonymy provides important clues for understanding the entire song's cultural background, revealing the powerlessness and predicament of masses opposing cultural norms in 1960s American society.

Further lyrical analysis shows that Simon constructed rich social images and cultural symbols through different rhetorical devices like personification, metaphor, and metonymy. For example, in the opening line "Hello darkness, my old friend" darkness as a symbol of death combines with loneliness, suggesting society's neglect and oppression of individual mental states. Following this, the metonymy of "vision" as "plant" further reveals society's pathological growth through structural metaphor. The "vision" here not only reflects analysis of personal inner world but also echoes divine visions in Christian culture, indicating that social degradation and cultural numbness are spreading through subtle influence.



Additionally, neon light as a symbol of "modernization" in the lyrics is cleverly metonymized as materialization of social alienation. Neon light represents a materialistic, consumer-dominated society while also carrying the alienating and controlling force hidden behind Western civilization's technological progress. Through the description of "neon light stabbing eyes" Simon reflects how industrial society oppresses individual thought and freedom, prompting audiences to notice how technology and consumerism silently dissolve human emotions and social communication in the modernization process.

Finally, through criticism of "materialism" culture and use of "graffiti" symbolism, the song's theme reaches a peak of social and cultural reflection. Here, "neon god" as a metaphor for idol worship reveals people's blind worship of money and consumption in a materialistic society, while "prophets' words written on subway walls" symbolizes lower-class people's rebellion and dissatisfaction. Through this metonymy, Simon expresses exposure of society's hypocritical mask and profound criticism of oppressive cultural systems, calling for people to find voice in silence and awaken in noise.

In conclusion, "The Sound of Silence" is not merely a song expressing deep emotions and loneliness; through sophisticated rhetorical techniques and use of metonymic rhetoric, it constructs profound reflection on American social, political, and cultural phenomena. In this song, Paul Simon not only demonstrates artistic expression of personal emotions but also successfully reveals the spiritual crisis and cultural predicament of American society at that time through skillful use of rhetoric. Every image and metonymy in the lyrics provides us with a unique perspective for understanding the social background and cultural trends of the 1960s while also reminding us to reflect on the deepening sense of alienation between individuals and society in the modernization process.

As Miller states, "rhetorical reading's" core remains deconstructive thinking, but it points not toward deconstruction but toward constructive, meaning-generating reading methods seeking new meaning generation. As a method of reading work texts, deconstruction focuses on studying various tension relationships within texts, discovering or generating richer and more diverse meanings through this deconstructive reading. As figurative metonymic rhetoric, interpreting its meaning requires extensive social knowledge accumulation as a prerequisite. Extensive social knowledge accumulation makes the transformation from literal to figurative meaning possible. It is through this knowledge that readers can derive various figurative meanings when reading texts. Meanwhile, due to different contexts, metonymic references will be altered in a chain of signification, making the interpretation of the textual meaning in "The Sound of Silence" inevitably indeterminate.

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BREAST CANCER MANAGEMENT

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ABSTRACT

Breast cancer has been recognised since antiquity, and as the disease's nature changed over time, so did the approach to treatment. Hippocrates classified breast cancer as a humoral illness in 460 BC, but following much research, it is now thought to have localised causes and systemic origins. Halsted radical mastectomy was the "established and standardised operation for cancer of the breast in all stages, early or late" for the majority of the 20th century. Recent discoveries on the biology of tumours and their behaviour raised the possibility that less invasive surgery could be just as successful as more involved ones. The scope of surgical resection in the breast and axilla was eventually further reduced with the use of adjuvant therapy, such as radiation and systemic therapy, ushering in an era of breast conservation. In an effort to shorten treatment times and minimise normal tissue harm, breast cancer radiation therapy has progressed from 2D to 3D conformal and accelerated partial breast irradiation. A proven method of treating breast cancer is systemic therapy, which includes biological agents, hormone therapy, and chemotherapy. The care of breast cancer today is predicated on the quickly developing and more comprehensive research on the cellular, molecular, biochemical, and genetic underpinnings of the illness. The task ahead is to leverage this understanding to forecast treatment outcomes, create new treatments, and quickly implement more cutting-edge biologic therapies.

INTRODUCTION

Breast cancer is a complex and diverse disease with varying biological behaviors. While surgery remains a cornerstone of treatment, numerous medical therapies have emerged. Effective breast cancer management relies on collaboration among specialists, including researchers, radiologists, pathologists, surgeons, radiation oncologists, medical oncologists, and psychologists. Through their collective efforts, significant advancements have been made in three key areas: local breast treatment, regional lymph node management, and systemic disease control, leading to improved patient outcomes.

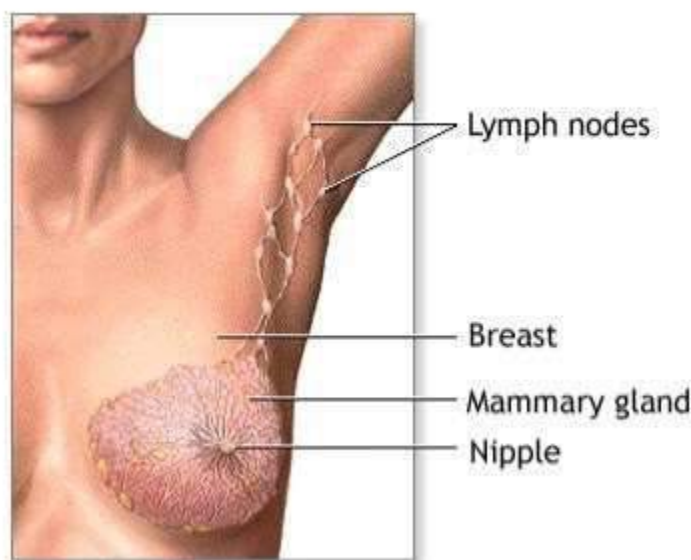


Fig.1. Breast Cancer.²²



HISTORY

Breast cancer has been documented throughout history, with the earliest recorded cases found in ancient Egyptian medical texts over 3,500 years ago. The Edwin Smith papyrus (circa 3000-2500 BC) describes eight breast cancer cases, noting no effective treatment, except for one instance of cauterization.¹ Ancient Indian texts (around 2000 BC) mention surgical excision, cautery, and arsenic compounds for treatment. In ancient Greece, Hippocrates (460 BC) attributed breast cancer to humoral imbalance, while Galen (131-203 AD) linked it to excess black bile. By the 16th century, techniques advanced. Andreas Vesalius introduced ligatures, and Jacques Guillemeau advocated for removal of the pectoral muscle along with the breast tissue. These early descriptions and treatments laid the groundwork for modern breast cancer management. Breast cancer has been documented throughout history, with the earliest recorded cases found in ancient Egyptian medical texts over 3,500 years ago.²

The Understanding of Breast Cancer Progression Evolved Significantly with key contributions from:³

1. Descartes (1596-1650), who proposed a lymphatic origin theory, later supported by John Hunter (1728-1793).
2. Henry LeDran (1757), who introduced the concept that breast cancer begins locally, then spreads to lymph nodes and enters circulation, suggesting early surgery could potentially cure the disease.
3. Henry Arnott (1871), who reaffirmed the local origin of breast cancer and championed curative surgery through en-bloc resection at the earliest stage.

These pioneers recognized the importance of axillary nodes and lymphatic spread, shifting the focus from humoral theories to surgical intervention, offering hope for a potential cure through early treatment.

Surgery :- The Halsted radical mastectomy, introduced in 1882, significantly reduced local breast cancer recurrence from 51-82% to 6%. However, this extensive surgery caused deformity, lymphedema, and sensory issues. By 1912, surgeons modified the procedure, preserving the pectoralis muscles, and by 1948, Patey substantiated this approach. Radical mastectomies declined from 20% in 1976 to 3.4% in 1981. McWhirter's 1948 report and Fisher's prospective studies (1989) pioneered breast conservation and adjuvant radiation therapy.⁴

Surgical Management of Operable Breast Cancer Involves

1. Primary tumor treatment: mastectomy or lumpectomy.
2. Regional lymphatic management: lymph node dissection or sentinel lymph node biopsy.

For locally advanced breast cancer, neoadjuvant chemotherapy reduces tumor bulk, followed by:

1. Breast conservation therapy.
2. Modified radical mastectomy (MRM).⁵

Radiation therapy:- By the 20th century's start, radiotherapy proved effective in treating breast cancer.⁶ Pfahler (1932) reported 80% 5-year survival in early-stage patients. Keynes (1937) achieved similar results using implanted radium needles. McWhirter's work (mid-20th century) showed simple mastectomy plus radiotherapy matched radical mastectomy's survival rates.⁷

Landmark Studies

1. Atkins et al. (1972): First randomized trial comparing conservative surgery + radiotherapy to radical mastectomy.
2. Fisher et al.: Prospective study proving breast conservation therapy with radiation equals radical surgery.

Recent Findings:- Danish, Canadian, and second Danish studies, Local control impacts survival; eradicating locoregional metastases improves outcomes.

Radiotherapy Advancements:- 1. 2D to 3D Conformal Radiotherapy (3DCRT)

2. Accelerated Partial Breast Irradiation (APBI)⁸

Systemic Therapy

There Are Three Primary systemic treatment options for breast cancer:



1. Endocrine Therapy (ET): For patients with estrogen and/or progesterone receptor-positive tumors (approximately 2/3 of cases).
2. Chemotherapy (CT).
3. Biological Therapy (BT): Targeted agents focusing on specific molecular targets in cancer cells and their environment.

These modalities provide effective systemic management of breast cancer.⁹

Hormone therapy: - By the 19th century's end, Thomas Beatson showed breast cancer's hormonal dependence through tumor regression after surgical oophorectomy. Later, adrenal and pituitary gland surgeries confirmed this. The discovery of estrogen receptors in breast tumors solidified hormone dependence.¹⁰

Today, medical endocrine therapies have replaced surgical ablation:

1. Tamoxifen (estrogen antagonist) replaced oophorectomy.
2. Aromatase inhibitors (anastrozole, letrozole, exemestane) replaced adrenalectomy.
3. LHRH agonists replaced hypophysectomy.¹¹

Hormone receptors (ER, PR) and HER2 status guide therapy choices:-

1. ER/PR-positive patients: Hormone therapy (tamoxifen, aromatase inhibitors, ovarian suppression) + chemotherapy.
2. HER2-positive patients: Anti-HER2 targeted agents improved prognosis.

New Developments:- Fulvestrant, a steroidal estrogen receptor antagonist, for advanced breast cancer post-endocrine.¹²

Chemotherapy :- Chemotherapy's introduction in the 1950s-60s revolutionized treatment for advanced solid tumors and hematologic neoplasms. In breast cancer, initial single-agent chemotherapy (e.g., cyclophosphamide, methotrexate) yielded 0-38% response rates. Combination chemotherapy emerged:

1. Cooper's regimen
 2. Bonadonna's CMF protocol (Cyclophosphamide-Methotrexate-5-Fluorouracil), introduced in 1976
- CMF became the gold standard, but anthracycline-based regimens replaced it in the 1990s. A 2005 EBCTCG review showed: - Anthracyclines reduced breast cancer death rates by 38% (under 50) and 20% (50-69)

- Adding taxanes to anthracyclines improved outcomes¹³

Pivotal Trials

1. CALGB 9344 and NSABP B-28: Paclitaxel after AC (doxorubicin+cyclophosphamide)
2. BCIRG 001: TAC (docetaxel+doxorubicin+cyclophosphamide) outperformed FAC (5-fluorouracil+doxorubicin+cyclophosphamide)

These advancements significantly improved early-stage breast cancer treatment.¹⁴

Targeted Therapy:- Targeted therapies revolutionized cancer treatment by selectively inhibiting mechanisms driving cancer growth, invasion, and metastasis.

1. Imatinib (BCR/ABL TKI): Proved targeted therapy's efficacy.
2. Tamoxifen: First targeted therapy in breast cancer.
3. Trastuzumab (HER2/neu monoclonal antibody): Cornerstone in HER2+ breast cancer treatment. HER2 overexpression (20-25% of breast cancer patients) leads to aggressive tumor behavior. VEGF receptor family is another crucial target in angiogenesis and metastasis.¹⁵

Breakthroughs

1. Bevacizumab (VEGF monoclonal antibody): Approved with paclitaxel for HER2-negative metastatic breast cancer.
2. Lapatinib (dual HER1/2 TKI): Active in trastuzumab-pretreated metastatic breast cancer.
3. Combination therapy: Lapatinib + trastuzumab effective beyond trastuzumab progression.¹⁶



Emerging Areas

1. PARP inhibitors (poly ADP-ribose polymerase inhibition).
2. Novel antibodies (pertuzumab, T-DM1).
3. Irreversible TKIs (neratinib, BIBW 2992).
4. Downstream signaling inhibitors (mTOR, TORC ½, PI3K/Akt).
5. Receptor cross-talk inhibitors (estrogen receptor, insulin-like growth factor receptor).¹⁷

Future Research Directions

1. Evaluating novel agents in HER2+ breast cancer.
2. Investigating combination therapies.
3. Targeting downstream signaling and receptor cross-talk.¹⁸

Triple Negative Breast Cancer: Triple Negative Breast Cancer (TNBC) lacks estrogen receptor (ER), progesterone receptor (PR), and human epidermal growth factor receptor (HER2) expression, making it aggressive and challenging to treat. However, some patients respond to chemotherapy, emphasizing the need for optimized regimens.¹⁹

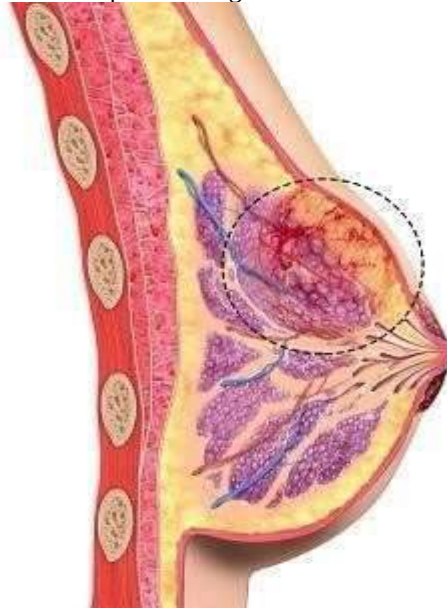


Fig.2. Triple Negative Breast Cancer ²³

Established Treatments

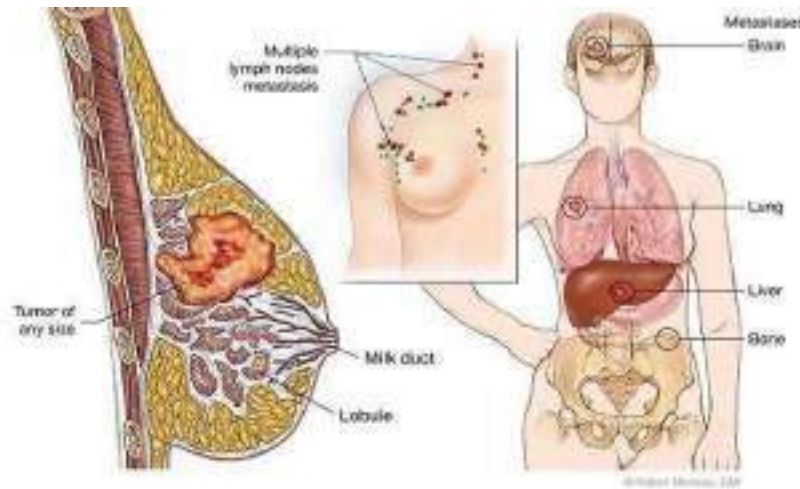
Taxane-based regimens (Level 1 evidence)

Emerging Approaches

1. Etoposides (microtubule-stabilizing agents) show promise in TNBC.
2. Ixabepilone (etoposide B analogue) is effective for TNBC.
3. Combination therapy: Ixabepilone + capecitabine outperforms capecitabine alone in taxane-sensitive/resistant ER-negative tumors.

New Horizons: PARP inhibitors (in clinical trials for TNBC) Optimizing chemotherapy and exploring targeted agents are crucial in combating TNBC.

Metastatic Breast Cancer: Managing metastatic breast cancer (MBC) lacks standardized treatments, unlike early-stage breast cancer. Guidelines:

**Fig.3.Metastatic Breast Cancer ²⁴****Hormone Receptor-Positive MBC**

- 1.Endocrine therapy preferred, unless aggressive disease or resistance suspected.
- 2.Individualize treatment based on patient profile, co-morbidities, and tumor biology.
- 3.Premenopausal: Tamoxifen + ovarian ablation.
- 4.Postmenopausal: Third-generation aromatase inhibitors.

HER2/Neu-Positive MBC

- 1.Trastuzumab (Herceptin) with/without chemotherapy.
- 2.Lapatinib + capecitabine for patients progressing after trastuzumab.

Chemotherapy Approach

- 1.Sequential single-agent therapy preferred over combination chemotherapy.
- 2.Reduced toxicity and improved quality of life. Key considerations:
 - 1.Patient safety profile.
 - 2.Tumor biology
 - 3.Co-morbidities.
 - 4.Quality of life^{20*21}

CONCLUSION

Breast cancer management has evolved due to advancements in understanding its pathogenesis, genetics, molecular biology, and technology. Today's approach integrates these disciplines. Despite progress, many women face recurrence and metastasis, while others receive unnecessary adjuvant therapy.

Future Directions

- 1.Recognizing tumor heterogeneity and molecular profiles.
2. Developing targeted therapies with increased efficacy and reduced toxicity
- 3.Personalized medicine: Identifying patients who will benefit from specific treatments.

Challenges Ahead

- 1.Predicting therapeutic outcomes.
- 2.Rapidly integrating novel biologic therapeutics into clinical practice.

The goal: Tailored treatments, improved outcomes, and enhanced quality of life for breast cancer

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INTELLECTUAL CULTURE AND ITS UNDERSTANDING IN THE DEVELOPED WORLD

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ABSTRACT

This article studies the diverse perspectives on the definition of the term "intellectual culture" and views the idea of discourse as a form of human thought autonomy

KEY WORDS: *Intellectualism, culture, culture of mass manipulation, manipulation with values, the essence of the concepts of mass culture and mass thinking*

In social philosophy, a paradigm is emerging that teaches citizens to live and work amidst intensive changes, and to activate themselves in an innovative society. This, first and foremost, sets new demands for the intentionality of human activity, emphasizing the importance of implementing and developing intelligence and creativity as the most mobile resources.

The essence of innovative content includes the analysis of the social and humanitarian significance of innovations, which finds expression in the values and ethical norms of the creative individual. The increasing volume of innovations in technological and socio-cultural fields often leads to self-denial of the emerging novelties, which in turn causes social pathology and brings about instability and chaos. Such aspects of innovative development must become the subject of research and analysis in social and humanitarian sciences.

The high level of intellectual development and creativity serves not only as a guarantee of the efficiency of the mechanisms of economic and social development of society and state security but is also the foundation of personal freedom. Such individuals are resistant to social manipulation and are relatively free from the influence of mass culture, media, and other information sources. It should be emphasized that the intellectual-ideologist model is a creator of high moral values, and a social critic cannot claim universality in today's world. However, there is a need for such individuals in society.

In their recent works, American scholars have been paying special attention to the concepts of "intellectual" as a clear thinker and "social critic" (distinct from a technician or specialist). The number of intellectuals in the United States is higher compared to other countries in the world. This has led to the expansion of the efforts and endeavors of American intellectuals, and their activities in public, educational, innovative, and charitable organizations continue to grow. According to the views of Richard, the author of the term "creative group," this group already constituted approximately 30-40% of American society, that is, about 40-50 million people. They received the highest votes in the national elections during the presidency of Bill Clinton.

Current philosophical research and studies in other sciences are advancing various theoretical systems, scientific concepts, and approaches related to the culture of intellectualism. For instance, in recent years, there have been ongoing debates among different approaches to studying the problems of intellectual culture. In order for an individual to possess a unique intellectual culture, it is essential to first achieve self-education, to know skills, to use them effectively, and to develop one's inner abilities and talents to a high level.

It is important to note that a person's intellectual culture plays a significant role in finding solutions to the difficult problems they face and in freeing themselves from moral and ethical ailments, even strengthening their divine beliefs. Therefore, special attention is given to the issue of "developing a scientific-technical search and analysis system to fulfill the tasks defined in the 'Concept for the Development of Science until 2030,' achieve relevant indicators, as well as apply scientific achievements from abroad in the conditions of Uzbekistan."



An intellectual person is one who possesses superior intellectual knowledge in their profession, and as American scholars rightly emphasize, is a "highly moral creator who deeply understands the interests of the community." Intellectual thinking reflects the moral and civic requirements of an individual's freedom of thought. Consequently, some scholars today are earnestly working to abandon the concept of "intellectual" or "consensus-seeking individual" and to replace it with the concept of "intellectualism." It is a significant requirement of society that intellectuals must be individuals who embody intellectual freedom. Such individuals are prepared to suffer for the truth, endure persecution, and connect their ideas with their destiny. For instance, American "intellectual elites," who have tasted the bitter fruits of democracy related to elections in their time, have often expressed deep concern about societal issues. Regarding this, New York editor and Washington Post correspondent in Moscow, David Remnick, writes in an article dedicated to the election results: "Last night, when the results from the last states came in, a friend called me—he was in deep despair and anguish from the fear of the controversy. Why should we not leave the country in wartime? However, despair is not a solution to the problem; rather, it remains to fight against authoritarianism, expose lies, and fight with the cruelty of American ideals." This self-expression and the desire to stabilize the future of the state and society was undeniably a common goal of the intellectuals of that era.

The United States has aimed to establish a bastion of world democracy that safeguards its foundations from all corners of the globe. Recently, the United States has also been exerting pressure on Iraq, Syria, and other Middle Eastern countries against aggression, which is closely related to the aforementioned democratic factor. In our opinion, the increasing activity of intellectuals in seriously monitoring these processes and in establishing peace in the global community will continue to gain priority importance.

As stated above, American intellectuals have historically carried out strong and noteworthy work compared to the intellectuals of former Soviet Union countries. However, we consider the role of intellectuals to be high in studying their policies through rational decisions, critical, and analytical reflections, and expressing their opinions in due time. Therefore, even today, we can rightly say that American intellectuals, by deeply sensing the main goals and objectives of the new government and some political forces that elected it, should strive to maintain their civic positions and connect their lives through moral and ethical means, meaning they should become genuine humanitarian and selfless intellectuals. After all, the primary task of a person who thinks freely is not to serve the basic instincts of the majority or the promotional demands of the upper echelon, but rather to critically reflect on these processes.

For this reason, we believe that it is essential to not abandon the concept of "intellectualism," but rather to live up to the humanitarian demands contained within it.

Today, the majority of American intellectuals work in industrial corporations or government agencies. This refers not only to engineers and technicians or teachers but also to writers, publicists, and literary scholars. It is known to us that these creative individuals in most cases cannot live on the remuneration they receive for their works. Thus, they prefer to sacrifice their "freedom" for a more secure financial situation. In the 1920s, only 9% of the authors of small literary journals were employed as teachers. By the 1950s, this figure had increased to 40% among such individuals who were active in universities and colleges. However, the transformation of intellectuals into office employees has brought their status significantly closer to that of the working class. Even Marx noted in his time about teachers working in hired positions that they could be viewed as "ordinary hired workers in educational institutions by an entrepreneur or an owner of an educational institution." Modern intellectuals belong to a similar category as well. The journal "Problems of Peace and Socialism" reflects this in its discussions on the composition of the modern working class, indicating that engineering and technical personnel represent a significant portion of it.

In modern developed countries, professionals, specialists in their fields, and intellectually developed individuals hold the highest positions. Some scholars propose their own interpretations of the approaches to defining intellectuals. In this regard, E.I. Kukushkina's position, which reflects a socio-historical approach, deserves attention. The scholar identifies two main directions for analyzing the problem of intellectuals.

"The first is to study the nature of intellectuals as a social phenomenon, which provides a wide opportunity to assess their role in society and the historical process. As a result, a specific construction is created – an ideal image of intellectuals that possesses a complete collection of distinctive characteristics is formed. The task of the second direction is to study the actual practices of intellectuals who perform social functions assigned to them according to the existing system of social labor distribution."

In our view, the first approach can be conditionally linked to a philosophical approach, since through this perspective we can have a conception of the ideal image of intellectuals, whereas in the second approach, sociological factors take precedence.



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THE CONTRIBUTION OF MUHAMMAD RAHIMKHON FERUZ TO THE EMERGENCE OF A NEW WAVE OF ENLIGHTENMENT WITHIN KHOREZM'S LITERARY SCENE

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ABSTRACT

This article discusses the activities of Muhammad Rahimkhan Feruz, who lived and worked from 1844 to 1910, focusing on his roles as a statesman, leader of literature and arts, progressive thinker, and advocate for education and enlightenment. It highlights his contributions to the development of a new enlightenment movement in the literary environment of Khorezm. The article demonstrates that during Feruz's reign, Khiva became a cultural and literary center, marking a period of significant progress.

KEYWORDS: *Feruz, Khorezm literary environment, khan, poet, enlightenment, progressivism, school, madrasa, education, new methods, printing, builder, exact sciences, spirituality, photography, cinema.*

The period of national revival in Uzbek literature spans from 1865 to 1929. The period from 1865 to 1905 represents the first stage of national revival in Uzbek literature, which is also referred to as the era of enlightenment literature. The period from 1905 to 1929 marks the second stage of national revival literature. It is known that in 1865, Tashkent was captured by Russia. This year is widely accepted in literary studies as the beginning of the national revival period in Uzbek literature. The year 1929 is considered the conclusion of the national revival period in Uzbek literature, specifically the end of the Jadid movement. This is because, from this year onward, the Jadids were physically eliminated. The period of new enlightenment and Jadid literature in Khorezm also mostly coincides with these years, with some differences. In our opinion, the period of new enlightenment literature in Khorezm began in 1863, with the ascension of Muhammad Rahimkhan Feruz to the throne. As the literary scholars H.Abdullayev and M.Yuldashev noted, "The foundation of Jadidism in Khorezm, which was based on enlightenment, was initiated by the palace officials, personally by Feruz, and initially manifested in the cultural and literary sphere [1]."

During the reigns of Khiva khans Muhammad Rahimkhan I, Allahkulikhan, and Said Muhammadkhan, great importance was placed on knowledge, enlightenment, and construction. However, the level of organization and the breadth of the new enlightenment movement were not as extensive as during the reign of Muhammad Rahimkhan Feruz.

Muhammad Rahimkhan Feruz is considered the founder and leader of the new enlightenment movement in Khorezm. As soon as he ascended the throne in 1863, he made great efforts to promote enlightenment. During his reign, changes began to occur in all fields. He made it a custom to hold poetry gatherings and book reading evenings at the palace on Mondays and Fridays. Feruz had considerable knowledge in literature, language, calligraphy, history, and geography. He was fluent in Persian, Tajik, Turkish, Azerbaijani, and Tatar languages. He also actively engaged in music, composing 13 pieces in the Shashmaqom style. He personally awarded certificates to musicians and singers, and issued a decree to punish those who misrepresented folk music. Feruz paid great attention to the affairs of calligraphy and literature. He developed the tradition of establishing libraries, writing history, and promoting translations. Under his leadership, the Khorezm translation school emerged, and more than 80 translators engaged in this field, as studied by the literary scholar N.Komilov.

In 1874, thanks to Feruz's initiative, printing was established. In the early stages, the works of Alisher Navoi and the collections of Khorezm poets were printed.

"Feruz brought rare books from India, Arabia, Iran, and Turkey through traders and had them copied in large quantities, creating a rich library on history and literature. He also promoted arts such as architecture, painting, and calligraphy. During his reign, photography and cinema arts emerged [2]". Feruz created favorable conditions for Khudoybergan Devonov to study photography. Devonov learned photography from one of the Germans, Wilhelm Penner, who had settled in the village of Okmasjid near Khiva. Known for their pacifist views due to their Mennonite beliefs, these Germans had fled Germany (Prussia) and come to Russia to



avoid conscription. Upon the invitation of Russian generals, they moved to Khiva. Feruz provided them with land near Okmasjid, where Devonov began his studies. From 1890, Devonov learned the art of photography, and from 1907, he studied cinema under Penner's guidance. This was all a result of Feruz's progressive policies. Feruz did not follow the path of conservatism but instead created an environment in Khiva where photography and cinema could develop. Recognizing the significance of these arts, he became one of the first in Central Asia to establish photography and cinema in Khiva.

Muhammad Rahimkhan II, Feruz, was truly a builder and a statesman. Under his leadership, more than 30 madrasas, mosques, minarets, and khanaqas were built. In 1871, he constructed a two-story madrasa near the Old Ark. Several officials followed his example and built madrasas and mosques.

Feruz placed great importance on teaching both religious and secular subjects in madrasas. He personally attended madrasa examinations and allocated funds based on the knowledge level of the teachers.

“By a decree from Muhammad Rahimkhan on April 12, 1898, the collection of ancient artifacts began in the khanate. His instructions to the provincial governors were clear: Do not destroy any ancient items, and collect all coins, gold, and relics from historical sites. As a result, Khorezm's artifacts were showcased in international exhibitions, including in Tashkent (1890), Nizhny Novgorod (1895), Paris (1900), and Missouri, USA (1904) [2]”.

Feruz's attention extended to nearly every sphere, including museum studies. He personally took charge of preserving ancient artifacts.

The well-known scholar N.Jumakhodja wrote: “Besides being a state leader and military commander, Feruz was a talented poet, musicologist, and artist, a brilliant composer, and the unparalleled guide and patron of science, culture, literature, and art. He played a key role in the development of Khorezm's six famous maqoms, music theory, and the Khorezm miniature school. Under his patronage, over forty poets, writers, historians, translators, calligraphers, physicians, and artists thrived. Feruz established the first printing press in Turkestan and the first dispensary in Khorezm. During his reign, Khiva became a cultural and literary center, reaching the level of a second Herat [3]”. Indeed, this is a proper evaluation of Feruz's contributions to culture and his progressive leadership.

During Feruz's reign, more than 30 poets, including Ogahi, Komil, Tabibiy, Bayoniy, Mirzo, Avaz Otari, Fakiriy, Kholis, Nozim, Khayoliy, Mutrib Khonakharobiy and Haqiriy, produced significant works. His descendants, including Farrukh, Komyob, Murodiy, Oqil, Goziy, Azad, Sadiq, Sultoni, and Sadiy, continued this literary legacy. From this, it is clear that Feruz believed the foundation of enlightenment lay in encouraging everyone to become readers. He aimed for his officials, aristocrats, and governors to be literate and well-versed in poetry. He viewed the moral and spiritual elevation of society as his primary task. As Bayoniy wrote, “He was extremely friendly with scholars and was a compassionate, just, and virtuous person [4]”.

Feruz was also recognized as a poet, referred to as the “Master of Romantic Ghazals.” In 1995, literary scholar G.Ismoilova defended her dissertation on the “Literary Environment of the Feruz Era.” Several of Feruz's ghazals are preserved in the Manuscript Department of the Institute of Oriental Studies under the name of Abu Rayhan Beruni [5]. Ismoilova studied these manuscripts and concluded that many of the poems in these collections were copied by the renowned calligraphers of the time, especially one manuscript, number 12066, which stands out due to its elegance and the beauty of its calligraphy, created by the calligrapher Muhammad Panoh Khorezmi.

Feruz's contributions also extended to the field of education. In 1884, he established a new-style school in Khiva, and in 1891, he opened a Russian-native school under his leadership, employing teachers who had graduated from the Tashkent Teachers' Seminary. Feruz's initiatives in establishing modern schools were instrumental in the educational development of Khiva.

As Professor U. Dolimov writes, “The formation and development of the new-style schools in Khorezm and Bukhara differed significantly. In Bukhara, there was fierce opposition from the upper class and conservative scholars, while in Khorezm, the khan led the movement, and even local teachers showed a great deal of resistance [8]”.

From the above, it is evident that Muhammad Rahimkhan II—Feruz—was an extraordinary figure: a statesman, a patriot, a talented poet, and a promoter of education and progress. He made substantial efforts to ensure that all people in Khiva became literate and encouraged enlightenment. He supported the development of literature, art, medicine, and science. He also played a key role in the construction of the railway, recognizing its importance for economic growth. His efforts to advance education and his progressive leadership left a lasting impact on Khiva, laying the foundation for a new era of enlightenment in the region.



This translation captures the essence of your text, including Feruz's significant role in education, art, and the cultural development of Khorezm. Let me know if you need any further adjustments!

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COMPARISON OF CLINICAL CHARACTERISTICS OF STAPHYLOCOCCUS AUREUS INFECTION IN ELDERLY AND YOUNGER ADULT PATIENTS IN KURDISTAN REGION. IRAQ

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ABSTRACT

The study aimed to determine the clinical characteristics and outcomes of *Staphylococcus aureus* infections are different in elderly patients as compared with younger adults, the study started from January 2021 to December 2022, the samples were collected from male and female patient of 2 hospitals in Zakho and Duhok cities, were stratified into two groups by age, those 60 years or older were considered 'elderly' and those aged 15 to 59 years were defined as a younger. Of 481 patients with an *S. aureus* infection. 249 (51.67) were classified as younger, while incidence rates of elderly patients were 232 (48.33). Pneumonia was the most common *S. aureus* infection in the younger group and skin and soft tissue infection, bacteremia infection, Bone and joint infection, Surgical site infection and endocarditis infection was the most common in the younger group comparative with the elderly group, Old age (60 years) was confirmed to be a strong independent risk factor for death in the entire study population after adjustment for confounding variables. And the clinical Characteristics in elderly and younger patients with *Staphylococcus aureus* infection. was incidence most common in the younger group comparative with the elderly group rates.

KEYWORDS: *Staphylococcus aureus* Aged. Infection, outcomes, Clinical characteristics.

INTRODUCTION

Staphylococcus aureus is both a commensal bacterium and a human pathogen. Approximately 30% of the human population is colonized with *S. aureus* (1). Simultaneously, it is a leading cause of bacteremia and infective endocarditis (IE) as well as osteoarticular, skin and soft tissue, pleuropulmonary, and device-related infections. We do not address in any significant depth issues regarding colonization or mechanisms of drug resistance and refer readers to recent reviews (1–6).

Elderly population is increasing in the developed world, both in terms of absolute numbers and proportion of the entire population. In the UK, from 1982 to 2002, life expectancy at the age of 80 increased from 5.8 years to 7.2 years in men and from 7.5 to 8.7 years in women. Trends are similar in other countries where elderlies represent more than 10% of ICU admissions (1–3). Infection, either as a cause of admission to intensive care units (ICU) or as complication during the ICU stay, represents a major health-care issue. It is estimated that elderly adults account for 60% of all ICU days, indicating a prolonged and frequently complicated length of stay (LOS) in an environment with increased rates of nosocomial infections owing to the severity of illness, multiplicity of invasive procedures and complexity of antibiotic and non-antibiotic treatments (3–6). Large epidemiological studies on outcomes of elderly adults after ICU admission are limited. Most data derive from small reports usually from single centers, describing a particular infection or syndrome, while few studies are available on ICU acquired infections (7–14). The most frequent infections in the ICU are respiratory infections, followed by urinary tract (UTIs) and bloodstream infections (BSIs) including catheter related infections (CRIs) (15,16). The definition of elderly patient is a matter of debate. The adult of 65 years old is considered elderly due to insurance reasons. However, aging is a continuous and host-specific process, therefore the subgroups of 65–74 (young-old elderlies), 75–84 (old elderlies) and >85 (old-old or oldest old elderlies) have been used (4,17,18). Over the past three decades, the incidence of *S. aureus* infections has increased and methicillin resistance among *S. aureus* isolates has been a growing problem. (6,7) With the continuing increase in the annual incidence of *S. aureus* bacteremia across all age groups and the continuing increase in the elderly population,

staphylococcus aureus infections have become significant causes of morbidity and mortality in older patients. (19,20,21) Older persons generally have greater susceptibility to infections than younger adults (22). Urinary tract infections, pneumonia, skin and soft tissue infections, intra-abdominal infections, infective endocarditis, bacterial meningitis, tuberculosis, and herpes zoster appear to have a special predilection for elderly individuals. (22,23) Probably because of the increased prevalence of chronic diseases in older individuals, bacteremia illnesses appear to be more frequent and more often associated with death. (23,24) Despite the clinical significance and increasing frequency of *S. aureus* bacteremia in older adults, only few studies of *S. aureus* bacteremia in older adults have been published. (25) In addition, although it is well established that many infections are both more frequent and more



often associated with mortality in older individuals, comprehensive studies focusing on elderly patients with *S. aureus* infection, not just bacteremia cases, are still limited.

Staphylococcus aureus is the second most common etiological agent of nosocomial bloodstream infections after coagulase-negative *Staphylococcus*. *S. aureus* was responsible for 20.2% of the 24,179 cases of nosocomial bloodstream infections included in the SCOPE project, yielding an incidence rate of 10.3 cases of bacteremia per each 10,000 admissions. *S. aureus* bacteremia can become complicated and progress to metastatic infection, recurrence, severe sepsis, septic shock, and death. The mortality rate associated with *S. aureus* bacteremia (11–43%) has not varied over the last few decades. Six to 12% of cases present recurrence and up to 31% of patients may present metastatic infection (26-35).

Staphylococcus aureus is also reported to be the second most common cause of bloodstream infection after coagulase-negative *Staphylococcus* in patients with neoplastic disease (36). Among the oncological patients seen at Instituto Nacional de Cancerology (INC) during 2002, 57% of the 261 episodes of bloodstream infections were Gram-positive, and *S. aureus* was the main microorganism isolated (31% of all isolates) (37). Similar data were reported by Carney et al at the beginning of the 1980s in the oncology unit of the Veterans Administration Medical Center in Washington, DC, where *S. aureus* was the main causative agent of bloodstream infection (responsible for 23% of all cases) (38). However, more recent reports in developed countries have shown a lower prevalence of *S. aureus* bacteremia: 13% in 1998 and 8% in 2004 (39-45).

The risk factors predicting complications and mortality in patients with *S. aureus* bacteremia have been extensively described over the last few decades; however, the related information regarding cancer patients is scarce (46-52). The aim of the present study was to determine the mortality-predicting risk factors of *S. aureus* bacteremia in cancer patients.

The purpose of this study was to more clearly determine whether the clinical features and outcomes of *S. aureus* infections are different in elderly patients as compared with younger adults.

MATERIALS AND METHOD

Study of *S. aureus* infections started from January 2021 to December 2022, the samples were collected from male and female patient of 2 hospitals in Zakho and Duhok, to determine clinical features and outcomes of *S. aureus* infection in relation age. to showed the difference between elderly and younger adults. were stratified into two groups by age: those aged 60 years or older were considered 'elderly' and those aged 15 to 59 years were defined as 'younger'. based on the time the culture samples were obtained. We compared data of the elderly group with those of the younger group. All patients were evaluated using a structured case record form. The following information was collected from cases: baseline demographic information, underlying diseases (pulmonary disease, neoplastic disease, liver disease, heart disease, neurologic disease, renal disease, and diabetes *S. aureus* infection was defined by the isolation of *S. aureus* from a normally sterile body site (e.g., blood, cerebrospinal fluid, pleural or peritoneal fluid, aseptically obtained deep-tissue aspirates, or surgical tissue samples). *S. aureus* pneumonia was diagnosed if patients fulfilled the clinical and radiological criteria of pneumonia. and *S. aureus* was isolated from adequate lower respiratory mellitus. infection was also classified as primary bacteremia. The type of infection was determined by physicians on the basis of the isolation of *S. aureus* from the presumed portal of entry and clinical evaluation

Statistical Analyses

The ratios and were calculated., and $p < 0.05$ was considered statistically significant. The software package was used for statistical analyses.

RESULTS

A total of 481 patients with *S. aureus* infection were included in the study. Of these, 249 patients (51.67%) whose age was 60 years or older were classified as the elderly group, and the remaining 232 (48.33) patients constituted the younger group. the younger group was incidences rate (percentage) of Pulmonary disease, Cardiovascular disease, Neurologic disease, Neoplastic disease, Liver and renal disease and Diabetes mellitus was higher comparative with the elderly group (Table 1).

Clinical Characteristics	Younger	%.	Elderly	%.
Pulmonary disease	38	15.26	36	15.52
Cardiovascular disease	43	17.27	40	17.24
Neurologic disease	41	16.46	39	16.82
Neoplastic disease	32	12.86	29	12.50
Liver disease	23	9.24	21	9.05
Renal disease	23	9.24	22	9.48



Diabetes mellitus	49	19.67	45	19.39
Total	249(51.67)	100	232(48.33)	100

The most common diseases (bacteremia, Skin and soft tissue, Bone and joint infection, Surgical site infection, Endocarditis, pneumonia, Urinary tract infection) incidence rate in younger group was high comparative with elderly group was low rate (all $p < 0.05$) (Table 2).

Table 2: Comparison of type of infection in elderly versus younger patients with *Staphylococcus aureus* infection.

Type of Infection	Younger	%.	Elderly	%.
Primary bacteremia	32	12.86	31	13.36
Skin and soft tissue infection	34	13.66	32	13.79
Bone and joint infection	31	12.45	28	12.09
Surgical site infection	11	4.42	10	4.31
Endocarditis	19	7.63	17	7.32
Pneumonia	45	18.07	43	18.53
Urinary tract infection	34	13.65	31	13.36
Concomitant bacteremia	43	17.26	40	17.24
Total	249	100	232	100

DISCUSSION

This study has provided a comprehensive evaluation of the clinical characteristics of younger patients with *S. aureus* infection, as well as those with *S. aureus* bacteremia. It appears that younger patients with *S. aureus* infection indeed have distinctive features when compared with elderly, and that younger patients have higher overall mortality than elderly patients. The presence of co-morbid conditions in elderly populations has been identified as a better predictor of impaired immunity than chronological age. (54,55) No statistically significant differences between the elderly and younger populations with regard to the clinical characteristics of patients with *S. aureus*.

However, even after adjustment for co-morbid conditions, our data showed that old age was one of the independent factors associated with increased mortality in patients with *S. aureus* infection. have also shown that younger patients have a greater risk of death with *S. aureus* bacteremia;(56). the types of infection with a poor outcome, were more common in the younger group than in the elderly group. such as lung and primary bacteremia, are associated with higher mortality in *S. aureus* bacteremia. (36).

The higher proportion of bacteremia and pneumonia in the elderly group could have influenced the mortality rate, because these infections have been found to be independent predictors of mortality in *S. aureus* infection.(36,53) Although the major focus in infectious diseases has been on young adults with infection or immunocompromised hosts, the vast majority of serious infectious diseases will be seen in the elderly population.(27) Therefore, clinicians who care for adult patients should become familiar with the clinical problems in the elderly population. We believe that providing data and information on some of the unique aspects of aging and *S. aureus* infection.

The presence of co-morbid conditions or severity of underlying illness is clearly a determinant of the mortality in patients with bacterial infections. Second, we were unable to obtain detailed information regarding the appropriateness of antimicrobial therapy for many cases. Consequently, we were unable to fully assess whether inappropriate antimicrobial therapy, which might be one of the risk factors for mortality, was more frequent in the elderly group. In addition, we did not study the effect of different available options for *S. aureus* infection on mortality. Third, we may have incorrectly identified the type of infection or have failed to identify metastatic infections in several cases, despite the prospective design of this study. However, these limitations would likely affect elderly and younger patients equally. Fourth, in our study a catheter-related bloodstream infection was classified as primary bacteremia, since the differentiation of catheter-related bloodstream infections from primary bacteremia is frequently difficult in clinical practice. However, there is a clear difference in management and outcomes for bacteremia with and without a removable focus

CONCLUSION,

our study showed that younger patients currently account for a major proportion comparative with elderly patients with *S. aureus* infection. and the clinical features of younger patients with *S. aureus* infection differed substantially from those of elderly patients in terms of underlying diseases, and type of infection. We also confirmed that *S. aureus* infection in the elderly population is a serious clinical condition, in which the mortality rate is more than twice that in younger patients.

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ETIOPATHOGENETIC FEATURES OF INFLAMMATORY PERIODONTAL DISEASES

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ABSTRACT

The article presents scientific data concerning the role of various oral factors in the development of gingivitis and periodontitis. The article presents the results of a study devoted to the study of pathogenetic mechanisms of development of inflammatory periodontal pathology. Etiopathogenetic aspects of periodontal disease development can be used in the complex treatment of these types of pathology.

KEY WORDS: *Etiology, Pathogenesis, Gingivitis, Periodontitis, Dentistry, Treatment.*

One of the most pressing problems in dentistry to this day is periodontal disease [9, 17]. Their significant prevalence, pathological changes in the dental system, and negative impact on the patient's body determine the importance of the problem of treating this pathology.

Modern epidemiological data indicate that pathological changes occur as a result of poor oral hygiene, poor-quality dentures and fillings, dental deformities, occlusal trauma, disruption of the structure of the tissues of the vestibule of the oral cavity, medications used, and past and concomitant diseases [16, 17]. Many researchers note the high prevalence of periodontal diseases among the population; with age, the frequency of lesions increases, along with this, the severity of the pathological process in the periodontal tissues increases [2, 3, 5].

Numerous theories of the etiology and pathogenesis of periodontal diseases can be divided into several groups: inflammatory-dystrophic in the first place is the toxic effect of dental plaque; metabolic and alimentary – nutritional and metabolic disorders; endocrine – hormonal disorders of regulatory processes in pathology of the thyroid, parathyroid, pancreas and sex glands; immunological – processes of autoallergy and autoimmunization, disorders of humoral and cellular immunity [1, 17]. For example, it has been established that immunological changes and autoallergization processes develop as destructive changes in periodontal tissues worsen.

In developed forms of periodontitis, the bactericidal properties of blood serum and saliva decrease, and titers of antibodies to altered gum antigens increase. The level of these antibodies fluctuates depending on the severity of the disease [1].

According to other authors, the allergic state of the body, including in periodontal tissues, is determined not by local causes, but by systemic disorders. Researchers have established such disorders of the immune system in periodontitis as neutropenia, suppression of the functional activity of T-lymphocytes, and an increase in their spontaneous blast transformation [1]. Primary damage to polymorphonuclear leukocytes and lymphocytes in periodontitis has been noted [4, 15].

Certain influence on Chronic emotional stresses have a significant impact on the human periodontium [3, 4, 5]. A. S. Grigoryan, Yu. A. Petrovich and co-authors consider the pathogenic influence of stress factors, manifested by the activation of lipid peroxidation, to be very important [4, 14]. Increased lipid peroxidation of cell membrane structures leads to changes in the permeability and osmotic properties of membranes, and, accordingly, to increased activity and the release of hydrolytic enzymes from lysosomes and subsequent cell autolysis. According to the authors, this may be a key link in the pathogenesis of the inflammatory-destructive process in the periodontium.

There is a lot of literature data on changes in the periodontium in dysfunctions of the endocrine system. The most well-studied periodontal changes are in diabetes: 90–93% of patients with diabetes have periodontal pathology [7].

V. N. Kopeikin created the concept of vascular-biomechanical mechanisms of periodontal diseases, which indicates that unidirectional and uniform subthreshold functional loads of teeth can be the direct cause of the pathological process in the periodontium [12, 13].

According to H. A. Kalamkarov, functional overload of teeth plays a certain role, causing a complex of pathological changes in the tissues surrounding the tooth [11]. In this case, destructive changes are local in nature, and inflammatory phenomena are not



expressed. In generalized periodontitis, functional overload is often a consequence of the pathological process in the periodontal tissues [8, 10]. It sharply increases the pathogenic effect and significantly slows down the rate of reparation [9].

Of knowledge about the etiology of inflammatory periodontal diseases often defines subgingival microflora as the dominant causative factor [6, 9, 16]. The most important factor for the development of periodontitis is supra- and subgingival plaque. The latter is especially important, localized in the space of the gingival groove and on the surface of the junctional epithelium. The microbial flora in periodontitis is diverse and depends on the severity and phase of the disease. Despite the diversity of the microbial landscape, some types of microorganisms are recognized as specific periodontopathogens. Combinations of these bacteria are found in places of greatest destruction of periodontal tissues. These include: gram-negative anaerobic microorganisms of the bacteroides group (*P. gingivalis*, *P. melaninogenicus*), to a lesser extent anaerobiospirillum, spirochetes, fusobacteria; gram-positive anaerobic bacteria of the actinomycete group (*A. naeslundii*, *A. viscosus*, *A. israelii*), to a lesser extent peptostreptococci.

The high pathogenicity of the above-mentioned bacteria is due to their virulence and the characteristics of energy metabolism. Microorganisms living in the gingival groove and periodontal pockets have acquired highly developed defense mechanisms. Most periodontal pathogens have a high ability to attach and penetrate tissues. Their invasion mechanism is similar to that of enteropathogenic bacteria. This property is a significant factor in the etiopathogenesis of periodontal diseases. The ability of these microorganisms to adhere to the basal membrane is also a predisposing condition for the development of the inflammatory process. The damaging effect of bacteria can be expressed in direct toxic action, causing inflammation and destruction, as well as indirectly, by stimulating immunopathological reactions. To date, it has not been determined which of these mechanisms is the leading one [16]. As a result of damage, activation or release of certain biologically active substances occurs, which determine the rate of development and intensity of the process.

Under the influence of histamine and serotonin, microvessels expand and their permeability increases, which is manifested by hyperemia, exudation, fibrin deposition, and leukocyte migration. Heparin, released during the breakdown of mast cells, reduces cellular metabolism and blocks mitosis and phagocytosis. Prostaglandins increase vascular permeability and enhance edema caused by histamine and bradykinin.

Over time, microcirculation disorders are observed in the underlying tissues, manifested in thromboses and impregnation of vessels and perivascular tissue with blood proteins. First of all, the venous knee of the capillaries is affected. A large number of exchange vessels are switched off, avascular zones are formed [14, 15]. As a result, tissue trophism is disrupted, and the cells switch to anaerobic respiration (glycolysis), characterized by the formation of a large number of toxic products. In addition, bacterial antigens can form immune complexes with antibodies in the gingival pocket, which activate the complement system, which leads to a powerful release of tissue and cellular mediators, activation of the Hageman factor, C3a- and C5a- fractions of complement, platelet-activating factor. Among the products of cell decay and serum proteins in the inflammatory focus, a large number of substances of polypeptide nature are isolated, capable of causing tissue and cell necrosis, increasing vascular permeability and activating leukocyte migration. Under the influence of tissue and bacterial hyaluronidase and edema, the main substance of connective tissue depolymerizes and passes into a sol state, losing its viscosity. Microorganisms and their toxins can penetrate into the resulting microspaces.

It has been established that in ulcerative-necrotic gingivitis, juvenile periodontitis, and some adult periodontitis, electron microscopic examination reveals a large number of anaerobic bacteria in the periodontal tissues, although in most cases plaque bacteria are unable to penetrate the epithelium and connective tissue [17]. The development of the clinical picture of periodontitis is also associated with a progressive decrease in the content of neutral glycoprotein in the epithelium, one of the main components of the tissue barrier. The process of local loss of neutral glycoprotein in the surface layer is considered especially important, which can also be considered a condition that promotes the migration of oral microflora into the epithelial layer [3].

Immunofluorescence method revealed that acute and chronic periodontitis is accompanied by focal alteration of the gingival basement membrane, facilitating the penetration of microflora into deeper tissues [17]. As a result, the epithelium of the gingival groove is destroyed, and collagenases and elastase produced by bacteria destroy connective tissue fibers, which leads to the development of an inflammatory-destructive process in the periodontal tissues.

Thus, therapeutic measures in the treatment of periodontitis should be aimed primarily at eliminating the microbial factor and reducing secondary tissue alteration.

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RESEARCH ON NEW APPROACHES TO CHINA'S OVERSEAS UNITED FRONT WORK IN THE CONTEXT OF MAJOR CHANGES UNSEEN IN A CENTURY

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ABSTRACT

In the context of major changes unseen in a century, the international situation is evolving, countries are accelerating strategic adjustments with an eye to future competition, and global uncertainty and instability are particularly prominent. Overseas united front work faces new changes, situations, and characteristics. Efforts to explore the patterns of overseas united front work, focus on resolving current hot issues and difficulties, and enhance work consciousness and initiative are extremely important for consolidating and expanding the united front in the new era and achieving the goal of the great rejuvenation of the Chinese nation.

KEYWORDS: *Major Changes Unseen in a Century, Overseas United Front, Chinese Culture*

1. INTRODUCTION

The united front is an important tool for realizing the great rejuvenation of the Chinese nation and plays a vital role in China's domestic and foreign affairs. In today's world, the international situation is complex and changing. World multipolarization, economic globalization, cultural diversity, and social informatization are developing in depth, with countries becoming increasingly interconnected and interdependent. International security challenges are intricate and complex, strategic competition among major powers is intensifying, and the international balance of power is undergoing new changes. The ideological struggle is sharp and complex, with unprecedented exchanges, integration, and confrontation of diverse thoughts. Meanwhile, China faces arduous tasks in advancing the peaceful reunification of the motherland and safeguarding national sovereignty, security, and development interests. Overseas united front work needs to serve "One Country, Two Systems" and the realization of the Chinese Dream of national rejuvenation. However, the structure of overseas Chinese communities is also changing, and the new generation of ethnic Chinese needs further cultivation and strengthening of their understanding and sense of belonging to their ancestral homeland. In the context of major changes unseen in a century, the timing, situation, mission, and tasks faced by the united front have undergone significant changes, and the importance of overseas united front work is increasing daily. The new changes, situations, and characteristics facing overseas united front work require us to strengthen the Party's comprehensive leadership, leverage civilian overseas advantages, emphasize enhancing the cultural attractiveness of overseas Chinese education, improve international public opinion guidance, and continuously promote the great unity and solidarity of Chinese people at home and abroad, gathering tremendous strength for achieving complete national reunification and the Chinese Dream of national rejuvenation.

The vast number of overseas Chinese are an important extension of the Chinese nation. Realizing the Chinese Dream of national rejuvenation cannot be achieved without the support and cooperation of overseas Chinese. Regarding the new changes, situations, and characteristics of overseas Chinese affairs, General Secretary Xi Jinping has proposed a series of new concepts, thoughts, and strategies around why we need an overseas united front, what kind of overseas united front we need, and how to develop the overseas united front in the new era, providing basic guidelines for the effective development of overseas united front work in the new era (Li, 2020, p. 5).

2 UNDERSTANDING THE IMPORTANCE OF OVERSEAS UNITED FRONT WORK FROM THE PERSPECTIVE OF MAJOR CHANGES UNSEEN IN A CENTURY

The world is experiencing major changes unseen in a century, which is both a historical observation and a political judgment, as well as a summary of changes in the world pattern over the past century. The outbreak of COVID-19 in 2020 has promoted the spread of conservative economic and political trends and anti-globalization amid various Western ideological trends. After the pandemic, isolation policies needed to prevent virus transmission have made international market segmentation, investment segmentation, and technological



obstacles the new normal. The changes in this major transformation are the changes in national strength and world rules and order behind these events, including the collective rise of emerging countries on the world stage, the decline of traditional Western powers, and changes in the status of non-traditional security and political issues. The major changes unseen in a century, characterized by "the East rising and the West declining", have triggered profound changes in great power relations. Facing the comprehensive deepening of the century's changes and the evolving international relations, China-US relations are the core thread for observing the direction of these major changes. We need to grasp today's trends and international affairs, recognize the importance of overseas united front work in China's two-way interaction with the world's major changes, enhance the consciousness and initiative of overseas united front work, shoulder the mission and tasks entrusted to the united front by the times, consolidate and expand the united front in the new era, better serve the overall work of the Party and the state, and pave a broad path for realizing the great rejuvenation of the Chinese nation.

3. NEW CHALLENGES FACED BY OVERSEAS UNITED FRONT WORK IN THE NEW ERA

3.1 Stigmatization of Overseas United Front Work

Western hostile forces often stigmatize China's united front. Facing China's steady increase in strength, some countries' anxiety continues to grow, leading them to create public opinion such as the "China threat theory" and use public opinion weapons to spread anti-China panic globally. They have also formed stigmatizing theories such as "infiltration theory", "racial theory", "thought control theory", "money theory", and "project theory" to achieve their goal of containing China's development. This has had serious consequences for overseas united front work, forming a basic "consensus": namely, that after the 18th National Congress of the Communist Party of China, the goals and scope of united front work expanded, attempting to guide, induce, and coerce overseas political forces. This has damaged the international image of our overseas united front work and deepened international society's misunderstandings and prejudices against our country. Meanwhile, stigmatization has also interfered with the normal work, study, and activities of overseas Chinese, international students, and related institutions, damaging normal exchanges and cooperation with other countries.

3.2 Expansion of Overseas United Front Work Target Groups

The expansion of overseas united front work target groups is mainly reflected in the broad unity and winning over of overseas Chinese and all people who love the Chinese nation. Traditional overseas united front work targets mainly included Taiwan compatriots, Hong Kong and Macao compatriots, and overseas Chinese. These groups have always been the focus of overseas united front work, as they have deep blood, geographical, and cultural ties with the motherland and are important forces in promoting national unity and rejuvenation. With the development of the times, the targets of overseas united front work are constantly changing, such as the succession of old and new overseas Chinese and the rise of new-generation overseas Chinese, requiring overseas united front work to continuously consolidate traditional targets while also focusing on studying and adapting to these new changes, making the work more detailed and comprehensive. For example, outbound and returned international students have become new work targets, with more diverse thinking and needs, increasing the complexity and difficulty of united front work.

3.3 Increased Coordination Difficulties in Overseas United Front Work

First, with economic and social development and deepening globalization, the scope of overseas united front work targets has expanded, including Hong Kong and Macao compatriots, Taiwan compatriots and their relatives remaining on the mainland, outbound and returned international students, as well as overseas Chinese and returned overseas Chinese and their relatives. These groups are widely distributed, have diverse backgrounds and varied needs, increasing the complexity of coordination work. Second, different departments may have functional overlaps or conflicts of interest, leading to situations of buck-passing and difficulty in forming synergy during coordination work. Additionally, inadequate information channels may hinder smooth coordination work. Third, overseas united front work requires substantial human, material, and financial resources but is often constrained by limited resources. Meanwhile, the significant differences in needs among different groups and individuals make it difficult to meet everyone's expectations and requirements. Fourth, in recent years, some Western countries have suppressed and contained our overseas united front work, bringing considerable difficulties and challenges. The complexity and variability of the international situation may also adversely affect overseas united front work, as international tensions and geopolitical conflicts may increase coordination difficulties.

4. NEW APPROACHES TO CONSOLIDATE AND EXPAND OVERSEAS UNITED FRONT WORK

The policy of overseas united front work is to consolidate and expand the alliance of patriotism, work with overseas Chinese children, broaden horizons, make friends widely, promote policies, unite hearts, and serve the realization of the Chinese Dream of national rejuvenation. Currently, China's overseas united front work must be built on a profound historical and cultural foundation, tell China's story well, shape and enhance China's international influence and cultural soft power, and use the greatest common divisor to unite



hearts, broaden the scope and targets of united front work, and establish new focal points for overseas united front work to form long-term mechanisms for the grand united front work pattern.

4.1 OVERSEAS UNITED FRONT WORK MUST BE BUILT ON A PROFOUND HISTORICAL AND CULTURAL FOUNDATION TO TELL CHINA'S STORY WELL

Chinese culture and our overseas united front work are complementary. General Secretary Xi Jinping pointed out: "The united and unified Chinese nation is the common root of Chinese children at home and abroad, the profound Chinese culture is the common soul of Chinese children at home and abroad, and realizing the great rejuvenation of the Chinese nation is the common dream of Chinese children at home and abroad". He also noted: "The common root makes our feelings deep and meaningful, the common soul makes our hearts beat as one, the common dream makes us of one mind, and we will certainly be able to write together a new chapter in the development of the Chinese nation in the new era" (Xi, 2014, p. 63). Spreading Chinese culture overseas and helping overseas Chinese and the international community better understand Chinese culture is to better conduct overseas united front work and correctly understand China's chosen socialist system and path of socialism with Chinese characteristics. Thus, in the context of major changes unseen in a century, overseas united front work must be based on a profound historical and cultural foundation. Of course, whether spreading Chinese culture overseas or conducting overseas united front work, the purpose is to "win hearts and gather strength", fundamentally uniting all forces that can be united to create a favorable external environment for China's peaceful rise to develop faster. Chinese culture is the spiritual bond that maintains the unity of all Chinese people. Culture is the sum of a country's or nation's way of life, constituted by national language, traditions, and other elements that form a nation's cultural characteristics. Chinese culture is profound, has a long history, and has sustained itself for thousands of years, possessing powerful national cohesion and centripetal force. In the long river of Chinese history, unity has always been the mainstream. Although there have been periods of division, the divided parties generally still considered themselves members of the Chinese nation and ultimately moved toward unity. Since modern times, especially since the War of Resistance against Japanese Aggression, although the Chinese nation has suffered humiliation and gone through tribulations, Chinese culture has never been interrupted, maintaining continuity and always maintaining national unity and state unification. After the founding of New China, this unity became even closer and became the foundation for establishing and consolidating the socialist system. Whether living under the socialist system with Chinese characteristics on the mainland or under capitalist systems in Taiwan, Hong Kong, Macao, and overseas, all Chinese share a natural, heartfelt common wish: to inherit and carry forward the excellent traditions of Chinese culture and revitalize China. Chinese culture is also an important foundation for China to achieve peaceful unification. The united front in the new era will further promote unity between domestic and overseas Chinese. This unity largely stems from a high degree of identification with Chinese culture and the national identity formed on this basis. Unity and unification are the foundation of the united front in the new era and the cornerstone of all our development; we must work on cultural transmission.

Chinese culture is the common soul of the Chinese nation. Xi Jinping pointed out: "Excellent traditional Chinese culture has already become the gene of the Chinese nation, rooted in the hearts of Chinese people, imperceptibly influencing Chinese people's ways of thinking and behavior" (Xi, 2014, p. 170). National genes are the spiritual bloodline flowing in the minds of national members, a shared spiritual force formed through long-term accumulation, and also a unique spiritual force of a nation, serving as the spiritual element that unites national members (Shi, 2021, p. 76). General Secretary Xi Jinping has extensively quoted excellent traditional cultural thoughts in a series of speeches. These thoughts are beneficial for uniting Chinese children and consolidating and expanding the united front, as the development of the new era's overseas united front cannot be separated from core values.

The Chinese Dream is the common dream of the Chinese nation. Patriotism is the core of Chinese culture. "Patriotism has always been the stirring main melody" (Xi, 2014, p. 58), serving as a powerful force driving development. This patriotism is concentrated in the ideals and actions of every Chinese child to realize the Chinese Dream. The Chinese Dream is the dream of the country, the nation, and also of individuals. Every Chinese person knows that only when the country and nation prosper can individuals prosper. To realize the Chinese Dream, we must carry forward the Chinese spirit and gather Chinese strength (Jiang, 2017, p. 10).

4.2 Broadening the Scope and Targets of United Front Work, Using the Greatest Common Divisor to Unite Hearts

The Chinese Dream is the long-cherished wish of several generations of Chinese people. The achievements since reform and opening up have shown bright prospects for realizing the Chinese Dream, which will greatly encourage all Chinese people, including Hong Kong, Macao, and Taiwan compatriots and all overseas Chinese children. General Secretary Xi Jinping pointed out: "Now, we are closer than any time in history to the goal of the great rejuvenation of the Chinese nation, and we have more confidence and capability than



any time in history to achieve this goal" (Xi, 2014, p. 240). This goal will greatly inspire and mobilize Hong Kong, Macao, Taiwan, and overseas Chinese people to join in building the Chinese Dream.

To broaden the scope and targets of united front work, make friends widely, and maintain friendships, we must liberate our thinking and broaden our horizons. We must unite all who love the country, support national unification, and are friendly to China. We should care for old friends, make new friends widely, develop deep friendships with good friends, and continuously expand the united front ranks. Making friends widely should have focus; while broadly acquainting ourselves with friends from various aspects and levels, we should take initiative to develop deep relationships with those who have political influence, economic strength, social prestige, and academic achievements, continuously maintaining emotional connections and enhancing friendships. For Hong Kong, Macao, and Taiwan compatriots, we should strengthen connections with Hong Kong and Macao associations and their representatives, continue working well with business circles, and gradually strengthen united front work with professional circles and Macanese of Portuguese descent. Promoting policies and uniting hearts is crucial. The success of any endeavor depends on the direction of people's hearts, and the peaceful reunification of the motherland is a cause that concerns the common wishes and fundamental interests of millions of Chinese children. To transform "peaceful reunification" and "One Country, Two Systems" from hope into reality, the most fundamental aspect is to win people's hearts politically, as proven by the practice of Hong Kong and Macao's return. The key to Hong Kong and Macao's return lies in the return of people's hearts. Only by convincing millions of Hong Kong and Macao compatriots that the political proposition of One Country, Two Systems and peaceful reunification genuinely protects their interests can it be transformed into the driving force to support and realize it (Zhang & Huang, 2013, p. 21).

4.3 Forming Long-term Mechanisms for the Grand United Front Work Pattern and Establishing New Focal Points for Overseas United Front Work

Adhering to the patriotic united front, continuously broadening its scope and targets, and uniting all forces that can be united are valuable experiences from over a century of the Chinese Communist Party's leadership in overseas united front development. This is also a practical requirement for creating a favorable international environment for realizing the great rejuvenation of the Chinese nation and an important path for promoting the building of a community with a shared future for mankind. To strengthen the overseas united front forces of Chinese children, systematic planning is needed to comprehensively enhance the effectiveness of united front work and form long-term mechanisms.

First, adhere to making friends broadly and deeply to achieve the most extensive and in-depth unity and grand alliance. Firstly, adhering to making friends broadly and deeply with overseas friends is an inherent requirement for strengthening overseas united front work forces. From a literal perspective, this specifically refers to forces that understand and are friendly to China, transcending definitions and limitations of nationality, occupation, and identity, meaning the population is broad, conforming to the united front work principle characterized by grand unity. We must first break out of small circles and expand our circle of friends. We need to make friends not only with developed countries but also with developing countries, as there is much work to be done with developing countries. Secondly, in making friends broadly, we should connect with social figures from various fields beyond politics, economics, and diplomacy, including cultural, scientific, educational, and religious circles. We must also coordinate traditional and emerging fields, emphasizing the role of today's information and network united front work, achieving effectiveness both online and offline. Of course, making friends must uphold the principle of seeking common ground while reserving differences, allowing for and respecting differences in political propositions and ideologies, judging whether to associate with them based on whether it benefits the Party and modernization cause. In matters not involving principles, seek common ground while reserving differences, gathering hearts and strength to pursue prosperity and development together.

Secondly, focus on doing well in the united front work for international students. As targets of overseas united front work, outbound and returned international students have received special attention from Xi Jinping since the 18th National Congress. Raising the banner of patriotism and actively calling on and mobilizing international students to succeed in their studies and serve the motherland is one of the key contents of overseas united front work. General Secretary Xi Jinping earnestly hopes that international students will "always take national prosperity, national rejuvenation, and people's happiness as their striving direction" (Xi, 2014, p. 59). We should be good at uniting them and leveraging their intelligence and wisdom to contribute to realizing the Chinese Dream of national rejuvenation; if they remain overseas, they should serve the motherland through various forms. Additionally, international students coming to China are bridges of communication between China and the West and are important components of understanding and befriending China. General Secretary Xi Jinping has exchanged cordial communications through letters with international students in China multiple times, making important instructions on education work for international students coming to China, encouraging them to do more practical research to



enhance their understanding of Chinese culture and the Chinese Communist Party. They should also cherish and utilize their valuable study opportunities, master skills, and bring their learned knowledge back to promote national construction in their home countries. They are encouraged to tell China's story to the world based on their deep understanding of China's real situation.

Third, do well in the overseas united front work for Hong Kong, Macao, and Taiwan. The overseas united front work for Hong Kong, Macao, and Taiwan should seek common ground while reserving differences under the premise of adhering to One China, respecting diversity, seeking common ground in realizing the Chinese Dream of national rejuvenation while reserving differences in social systems, values, and lifestyles. Do well in correctly interpreting and promoting "One Country, Two Systems", promote deep cooperation between Hong Kong, Macao, Taiwan, and the mainland, and safeguard national territorial and sovereign integrity.

Fourth, establish Internet thinking and build a talent think tank for overseas united front work. The foundation of united front work is gaining recognition. The Internet can break through time and space limitations, solve cross-national and cross-regional communication difficulties, and provide convenient conditions for spreading Chinese culture and maintaining friendly connections. Meanwhile, we can also leverage Internet personalized intelligent push technology and communication influence to tailor communication plans, conduct diverse and lively online publicity, positively guide mainstream public opinion, more accurately tell China's story, and more effectively spread China's voice. Furthermore, the Internet also provides convenience for establishing and improving talent think tanks for overseas united front work, quickly integrating information and resources, strengthening coordination work in a timely and effective manner, efficiently identifying outstanding talents for cultivation and training, and gathering talent resources for the long-term development of overseas united front work (Lin, 2023, p. 68).

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CONTINUED ASSESSMENT USING SHEWHART CHARTS: A PRELIMINARY INSIGHT INTO SUPERVISORY TECHNIQUE OF EVALUATING CUSTOMER SATISFACTION LEVELS

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ABSTRACT

Customer Satisfaction Levels and their measurement is significant for any Service Organization, especially keeping in mind the tangible nature of its products. Thus, the gradation, measurement and benchmarking of Customer Satisfaction is significant. In this paper the researchers have used the unearthed construct from an Exploratory Factor Analysis on data collected using SERVQUAL 22 item research instrument to create a set of Shewhart Control Curves on the Factors. The idea mooted by this research is a continued revision on the said curves, using contemporary data to create a model for continued assessment of customer levels.

KEYWORDS: Shewhart Charts, Customer Satisfaction, Continued Assessment, LCL, UCL

INTRODUCTION

Customer satisfaction is pivotal in driving retention and fostering long-term relationships with organizations. Research reveals that cumulative satisfaction, particularly before a customer decides to cancel, is strongly correlated with the duration of the relationship. This underscores the importance of consistently meeting or exceeding expectations throughout the customer journey. (Bolton, 1998) This research aims to decide on a preliminary framework for service organizations to continuously gauge customer satisfaction levels, identify outliers and revise constructs using Shewhart Charts.

METHODOLOGY, SCOPE & LIMITATIONS

Taking the path of generic diagnosticity, in order to introduce a framework, the research creates the initial set of Shewhart Charts using archived research, taking reference of data and an exploratory factor analysis, conducted by Datta Khan & Meel, 2021, creating a construct with the factors called "Health Precautions and Comfort", Service at Contact Point", "Travel Time Efficiency and Security", "Customer Care Efficiency", "Transparency in Dealings" and "24x7 Service", which we shall name F1, F2, F3, F4, F5, F6 respectively, representing vector $F = [F_i, i = 1, 2, \dots, 6]^T_{6 \times 1}$. The research had considered 35 variables, identified using a Focus group over the 22 multi item SERVQUAL instrument gauged using a Likert Scale over a simulated convenience sample of size 561. (Datta Khan & Meel, 2021) The original dataset, tested for reliability, depicted Chronbach Alpha Staistic of 0.962 and the simulated, pre-factor analysis data showed a Kaiser-Meyer-Olkin Measure of Sampling Adequacy of 0.9, thus lending genuinity to the unearthed construct. If we refer to the variables as vector $X = [x_i, i = 1, 2, 35]^T_{35 \times 1}$ and consider the Component Score Matrix $CSM_{6 \times 35}$ (Table 1) then we realize that $F = CSM \times X$ (Hair, Black, Babin, & Anderson, 2019) The research thus, then accessed the unsimulated data of the research (Datta Khan & Meel, 2021), a convenience sample (S) of size 128 with relevant Factor Scores, making the matrix $F_{ij}_{7 \times 128}$ and analysed them using $\bar{X}$ and CUSUM control charts (Datta, 2011) considering each 4 separate sub samples ($S_k, k = 1, 2, 3, 4$), for the computation of the Upper Control Limit (UCL) and Lower Control Limit (LCL). (Datta, 2011) This is justified as the construct is unearthed using Varimax Rotation, emphasizing minimized correlation and the Factor Scores of all Factors reflect the satisfaction level of the consumer with respect to the respective Factor and the App Cab service in general. (Research Input) and the sub samples have been selected after reorganizing the said data, using random numbers. At this point, it may also be noted that assessment of service quality is reflected by a measure of customer satisfaction which is the very basis of the research. (Wirtz, Lovelock, & Chatterjee, 2018)

It may be noted that, initially, this research creates feasible Control Charts to measure the Customer Satisfaction Levels of App Cab services in Indian City during 2021, essentially the "pandemic period". It would thus guide in procedure the measurement of Customer Satisfaction Levels in other service industries during black swan events such as the pandemic apart from the creation of Shewhart Charts to assess customer satisfaction wholistically and longitudinally, inclusive of the pandemic period. The research methodology can thus be extrapolated to create a regular dashboard service, powered by the soft measure of service quality, the Customer Feedback. (Wirtz, Lovelock, & Chatterjee, 2018) However, the research is designed based on factors unearthed from a



particular dataset, where the demographic details of the respondents are not explicitly considered, and actual implementation will need insight into data properties such as auto regression and normality considerations. The research output would be a generic proposal, which would further, be required to manage after consideration of the impact of extraneous variables. Thus, the results can guide generically; but for accuracy and reliability, the construct must be refreshed for the service industry and the environment.

REVIEW OF LITERATURE

Bolton, 1998 investigated the relationship between customer satisfaction and the duration of a customer's relationship with a continuous service provider. He developed a dynamic model to understand how cumulative satisfaction and service experiences impact underscores customer retention, with a focus on industries like utilities, financial services, and telecommunications. Bolton's (1998) dynamic model focuses on cumulative satisfaction as a key driver of customer retention. This model suggests that customer satisfaction builds over time through repeated interactions with a service provider. Positive experiences enhance satisfaction, while negative experiences can lead to dissatisfaction and shorten the duration of the customer relationship. The model highlights how the cumulative effect of service experiences impacts customer loyalty and emphasizes the importance of consistently meeting or exceeding customer expectations to foster long-term relationships. A particular note in this research is that negative experiences, especially during the nascent stages of the relationship, can significantly shorten its duration. For newer customers, such incidents are particularly damaging, as their trust and loyalty have not yet solidified. From a financial perspective, retention is directly linked to lifetime customer value. Enhancing customer satisfaction fosters loyalty and drives revenue growth, as satisfied customers tend to remain with the organization longer and contribute more over time. This research underscores this need to satisfy the customer in a continued manner and proactively address any service failures. By doing so, businesses can strengthen retention, maximize profitability, and cultivate lasting customer loyalty. (Bolton, 1998)

Resić & Somun-Kapetanović, 2009 professed the idea that understanding the quality of care for quality and complete system of quality applied in an organization had a direct impact on its market position. A product which was compliant with the needs, desires, expectations, demands and opportunities of consumers, provided a high level of satisfaction and a positive effect on consumer loyalty. This in turn, directly affected the competitive advantage of the organization as the costs of desired quality was less than the total costs arising due to costs of repairs and finishing, replacement and restorations as well as withdrawal and rejection of products. They attempted to use an actual example of companies from B&H to present suitable control map models for monitoring the quality of the production process. They utilized process data or measurement data of relevant quality characteristics during the production process of a manufacturing concern, based on which they observed that there was a need to improve the process supervision and reduce the risk of anti-coincidence with the specifications. On the basis of these, data proposals were suggested for improvements in the segment using the control chart. (Resić & Somun-Kapetanović, 2009)

Suchánek & Králová, 2019 investigated the interrelationships between customer satisfaction, loyalty, product knowledge, and business competitiveness within the food industry. It specifically focuses on customers with repeat purchase behaviour, exploring how these variables interact over time and influence one another. Customer satisfaction in this study is measured dynamically, combining transactional satisfaction (specific purchases) and cumulative satisfaction (overall experience from repeated purchases). It evolves, influenced by prior experiences, product quality, and loyalty. The dynamic approach, using Structural Equation Modelling, captures how satisfaction shapes and is shaped by expectations, loyalty, and product knowledge. The study reveals that customer satisfaction and product knowledge are critical drivers of competitiveness in the food industry. Satisfied customers exhibit greater loyalty, which in turn enhances their product knowledge. This reciprocal relationship highlights the importance of maintaining consistent product quality to meet expectations during repeat purchases. Moreover, while price sensitivity exists, a well-balanced price-quality ratio minimizes its impact on satisfaction and loyalty. The findings emphasize the need for businesses to engage customers directly—through strategies like product tastings—to improve knowledge, foster loyalty, and boost competitiveness. (Suchánek & Králová, 2019)

Samimi, Aghaie, & Tarokh, 2010 found that in the the-then highly competitive current business environment, the cost to attract new customers was much higher than the cost required to maintain the existing ones. They emphasized on striking a balance between the acquisition rate and defection rate through executing offensive and defensive marketing policies. They suggested to have real time information using an efficient method to monitor customer loyalty on a continuous basis. They put forward several control charts and classified the charts in two groups based on the scale used to assess customer loyalty. In the first group, customer loyalty was considered as a binary random variable modelled by Bernoulli distribution. In the second group, an ordinal scale was considered to report loyalty level. Performance comparison of the proposed techniques using ARL criterion indicated that chi-square and likelihood-ratio control charts developed based on Pearson chi-square statistic and ordinal logistic regression model respectively, were able to rapidly detect the significant changes in loyalty behaviour. Two illustrative synthetic cases were also explained to demonstrate how to apply the procedures and how to interpret their results,. (Samimi, Aghaie, & Tarokh, 2010)



Gregorio & Cronemyr, 2011 attempted to develop a model to help service organizations to set the specification limits according to the customer expectations. They developed their model based on the Kano model, SERVQUAL, Taguchi loss function, Importance Performance Analysis (IPA) and a new model, "the Trade-Off Importance". Their study was carried out on a survey of 18 external customers and internal stakeholders of the Service Division of Siemens Industrial Turbomachinery AB in Finspong, Sweden. Their model was robust enough to set credible specification limits. Moreover, their model was also considered to be a very powerful tool for service quality measurement and to set strategic directions. (Gregorio & Cronemyr, 2011)

Chen, Chang, Wang, & Huang, 2015 opined that service industry was the principal driving force behind global economic growth. This obviated the importance of ensuring service quality. However, the service-providing process envisaged many variables that were complex enough to be controlled easily. In the past, scholars had mostly used the proportion of customers with complaints to propose an index for service performance to ensure proper evaluation of service quality. The authors considered that timely monitoring was a significant issue. Hence, they focussed on the number of customer complaints. Their study proposed a theory-based service quality control chart to assist company management in their job of timely monitoring of customer satisfaction to ensure that service quality is being maintained. On the basis of the characteristics of the service industries, they divided them into those with large sample sizes and those with small sample sizes. For each of the types, they developed an appropriate service quality monitoring model and explained the operating procedures of the control charts to provide managers with a means to comprehensively monitor service quality. (Chen, Chang, Wang, & Huang, 2015)

Kim & Kwak, 2023 presented a novel framework for analysing customer complaints using review-based control charts and sentiment analysis. Their study addressed common challenges in customer feedback analysis such as limited review volumes and imbalanced attribute mentions, which they thought might have hindered effective decision-making. The proposed method proposed by them integrated sentiment analysis to evaluate customer reviews, categorizing sentiments associated with various hotel attributes. By employing lexicon-based sentiment analysis, the authors created a structured approach to assess the performance of hotel services based on customer feedback. The framework used in the study utilized review-based control charts to monitor complaint intervals, allowing for a clear visualization of service performance over time. The study also introduced a dynamic Importance-Performance Analysis (IPA) to prioritize attributes based on customer sentiment, enabling hotel managers to focus on areas needing improvement. The results of the study demonstrated the effectiveness of the proposed method in transforming qualitative customer feedback into actionable insights, ultimately enhancing service quality and customer satisfaction in the hospitality industry. This innovative approach provided a comprehensive tool for businesses to better understand and respond to customer complaints. (Kim & Kwak, 2023)

Raji, Abbas, Abujiya, & Riaz, 2021 in their study proposed the detection of outliers based on the Stahel=Donoho Robust Estimator (SDRE) and Mahalanobis Distance measures when the process parameters are estimated from the initial phase. They used run length properties as performance measures. (Raji, Abbas, Abujiya, & Riaz, 2021)

Raji, Lee, Riaz, Abujiya, & Abbas, 2020 noted that Shewhart Control Charts often are affected by errors due to data in the initial phase. They proposed the Tukey based model and Median Absolute Deviation model for efficient detection of outliers in the initial phase. They used performance measures based on run length. (Raji, Lee, Riaz, Abujiya, & Abbas, 2020)

ANALYSIS

Prior to the computations of Upper Control Limits (UCLs) and the Lower Control Limits (LCLs), the researchers have used random numbers to randomize the order of existent sample 6 times (there are 6 factors) [Assign Random numbers to SNo of Factors (3) sheet-Copy values to SNo-Sort as per SNo. Do 6 times. S1 is SNo 1 – 32 and so on]

Process Average is shown as being monitored by the $\bar{x}$ chart. We assume that $F_{ij} \sim N(\mu, \frac{\sigma}{\sqrt{n}})$ where, F_{ij} = the quality characteristic measured by F_i and submitted by the j th respondent and μ, σ are the population mean and standard deviation respectively. Then again, since μ_i and σ_i are not exactly known, we assume that they are estimated by the Grand Mean $\bar{\bar{x}}_i$ of the matrix $F_{ij} 1 \times 128$ and $\frac{R(i)}{d_2}$, where $R(i) = F_{ij}(\max) - F_{ij}(\min)$ over $j = 1, 2, \dots, 128$ or the range of the range of the complete dataset of F_i Now if the Relative Range W_k is computed as $w_k = \frac{R_k}{s_k}$ then $d_2 = \text{Average}(W_k)$

The relevant Control Limits CL_i , UCL_i , LCL_i of F_i are given by

Control Limit = $CL_i = \bar{\bar{x}}_i$ and Upper Control Limit (UCL_i) and Lower Control Limit (LCL_i) are $CL_i \pm \frac{3}{d_2\sqrt{32}} R_i$ (Datta, 2011)

The computations are shown in Table 2 and the Control Charts superimposed by the dataset F_{ij} are depicted by Fig 1, ..., 6 (X-bar and s Charts)



Component Score Coefficient Matrix						
	Component					
	F1	F2	F3	F4	F5	F6
x1	-.047	.061	.125	.038	-.060	-.113
x2	-.044	-.026	.178	-.013	-.039	.004
x3	.007	-.082	.016	.335	-.122	-.031
x4	-.029	.031	-.094	.386	-.146	-.050
x5	-.005	-.180	.019	.298	.025	.091
x6	-.027	-.130	.118	.144	.209	-.207
x7	.176	-.168	-.011	.010	.121	.030
x8	.032	-.242	.310	.014	-.028	.020
x9	-.031	-.021	.236	-.077	-.065	-.016
x10	-.014	.061	.076	.084	-.038	-.150
x11	-.004	.025	.118	-.099	-.057	.112
x12	.003	.003	-.054	.170	.057	-.004
x13	-.020	.005	-.008	-.210	.449	.032
x14	.006	.055	.127	.000	-.184	.001
x15	.066	-.030	.218	-.160	-.011	-.053
x16	-.068	.169	-.106	.060	.062	.015
x17	.002	-.105	.046	-.024	.307	.010
x18	-.057	.144	-.043	-.105	.086	.134
x19	-.049	.205	-.095	-.112	.197	-.035
x20	-.056	.227	-.039	-.062	-.016	-.009
x21	-.088	.316	-.127	.039	-.095	-.052
x22	-.044	.174	-.073	.080	-.045	-.019
x23	-.050	-.051	-.028	-.051	.013	.482
x24	-.029	-.030	-.084	-.036	-.030	.520
x25	.061	.179	-.051	-.180	.006	.025
x26	.104	-.014	-.168	.048	.224	.010
x27	.137	-.098	-.062	.043	.194	-.015
x28	.173	-.049	-.090	.081	.059	-.060
x29	.060	.075	-.020	-.015	-.032	.017
x30	.013	-.061	-.059	.123	.249	-.046
x31	.157	-.096	.142	-.041	-.186	.080
x32	.218	-.055	.116	-.114	-.110	-.093
x33	.211	-.088	.037	.064	-.154	-.079
x34	.098	.001	.111	-.012	-.136	-.033
x35	.054	.189	.005	-.128	-.099	-.038

Table 1: Component Score Matrix CSM_{6x35}



Sample	Parameter or Statistic	F1	F2	F3	F4	F5	F6
Sample S of size 128	Grand Mean, estimator of μ , CL	0.0648	-0.0773	-0.1177	-0.1167	0.0586	0.0123
	Standard Deviation, s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
	Xmax	2.0308	2.9497	2.2020	2.7242	3.5497	2.3269
	Xmin	-2.9260	-3.8824	-3.9144	-2.6827	-2.7401	-2.7867
	R	4.9568	6.8321	6.1164	5.4068	6.2898	5.1136
Sample S1 of size 32	Mean	-0.0740	0.2611	-0.2110	-0.1803	0.2293	0.2568
	Sample Standard Deviation, s1	0.9088	0.9300	0.8607	1.0294	0.6975	0.8091
	Xmax	1.9027	2.9497	1.5599	2.3095	1.7165	1.8171
	Xmin	-2.1857	-2.2345	-1.8752	-2.4268	-1.0326	-1.4103
	R1	4.0884	5.1842	3.4350	4.7363	2.7491	3.2274
	s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
	W1 = R1/s1	4.5431	5.2576	3.4994	5.1227	3.0025	3.3758
Sample S2 of size 32	Mean	0.0549	-0.1477	-0.2565	-0.1228	-0.2737	0.2642
	Sample Standard Deviation, s2	0.7873	0.8767	1.0871	0.8662	1.0480	0.7723
	Xmax	1.3951	1.4157	2.2020	1.3901	1.6837	2.3269
	Xmin	-1.3498	-3.7435	-2.5963	-2.6625	-2.6013	-1.4057
	R2	2.7449	5.1591	4.7983	4.0526	4.2850	3.7327
	s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
	W2 = R2/s2	3.0501	5.2322	4.8883	4.3832	4.6799	3.9042
Sample S3 of size 32	Mean	0.2229	0.0122	-0.0460	-0.1726	0.3610	-0.2142
	Sample Standard Deviation, s3	0.7568	0.8147	0.7229	0.6958	0.8212	1.0224
	Xmax	2.0308	1.7317	1.0833	0.9370	3.5497	1.2859
	Xmin	-1.9782	-1.4052	-1.5042	-1.8115	-0.7862	-2.7867
	R3	4.0090	3.1369	2.5874	2.7486	4.3360	4.0725
	s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
	W3 = R3/s3	4.4548	3.1814	2.6359	2.9728	4.7356	4.2598
Sample S4 of size 32	Mean	0.0552	-0.4347	0.0426	0.0089	-0.0822	-0.2575
	Sample Standard Deviation, s4	1.0847	1.1561	1.1619	1.0499	0.9183	1.0547
	Xmax	2.0191	1.5258	1.9764	2.7242	1.6106	1.5943
	Xmin	-2.9260	-3.8824	-3.9144	-2.6827	-2.7401	-2.6503
	R4	4.9451	5.4082	5.8908	5.4068	4.3507	4.2446
	s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
	W4 = R4/s4	5.4950	5.4848	6.0013	5.8479	4.7517	4.4397
	d2	4.3858	4.7890	4.2562	4.5816	4.2924	3.9949
	R/d2, the estimator of σ	1.1302	1.4266	1.4371	1.1801	1.4653	1.2800
	R Average	3.9468	4.7221	4.1779	4.2361	3.9302	3.8193
	UCL	0.5420	0.4457	0.4028	0.3736	0.5442	0.5194
	LCL	-0.4125	-0.6002	-0.6383	-0.6070	-0.4270	-0.4947

Table 2

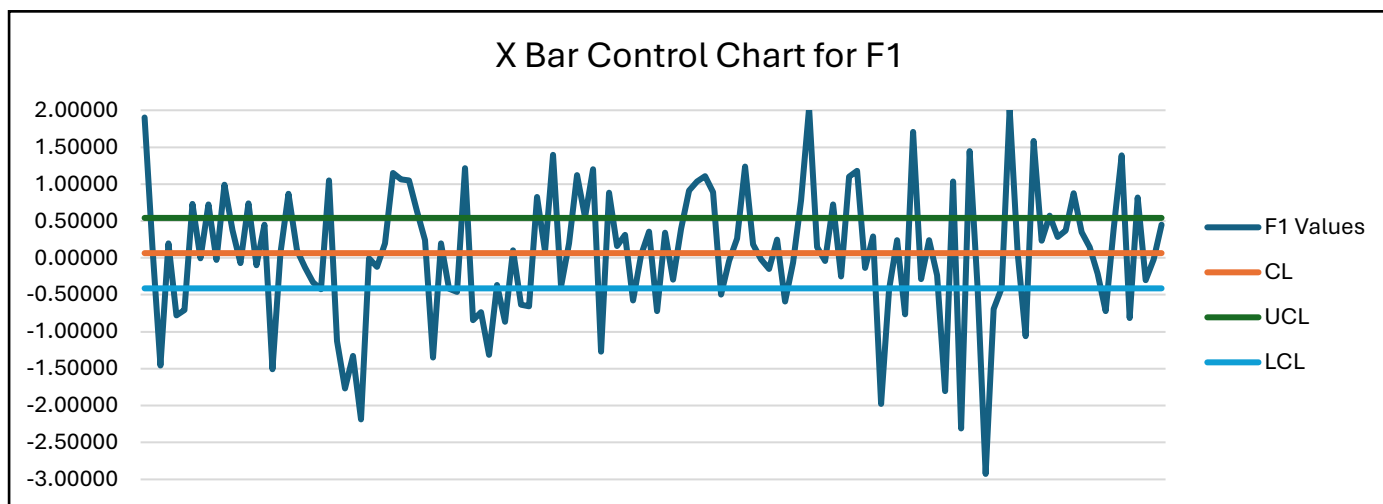


Fig 1

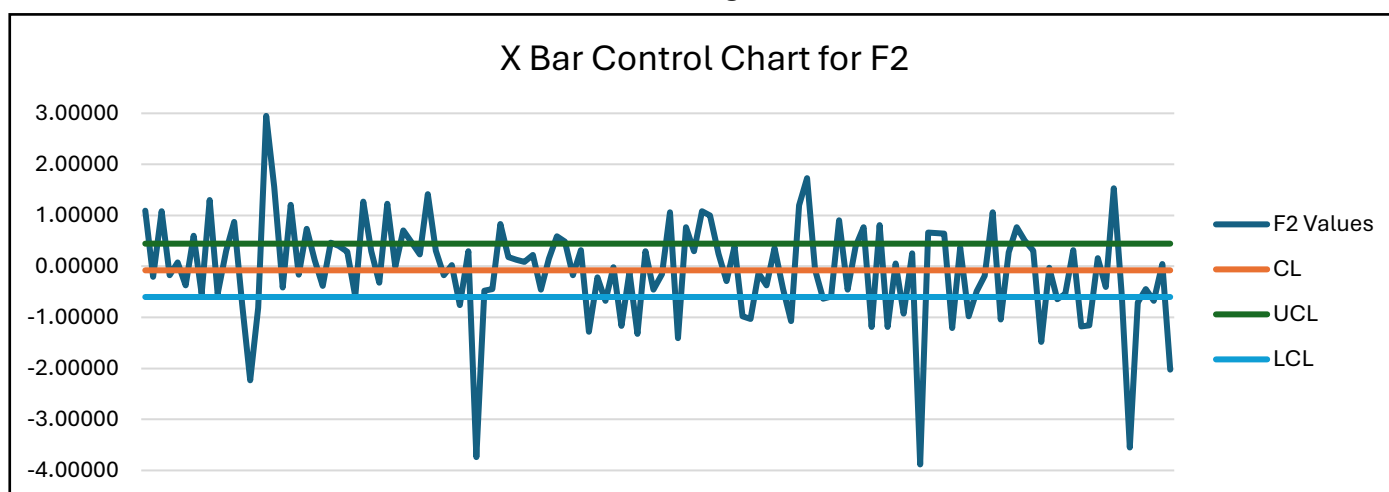


Fig 2

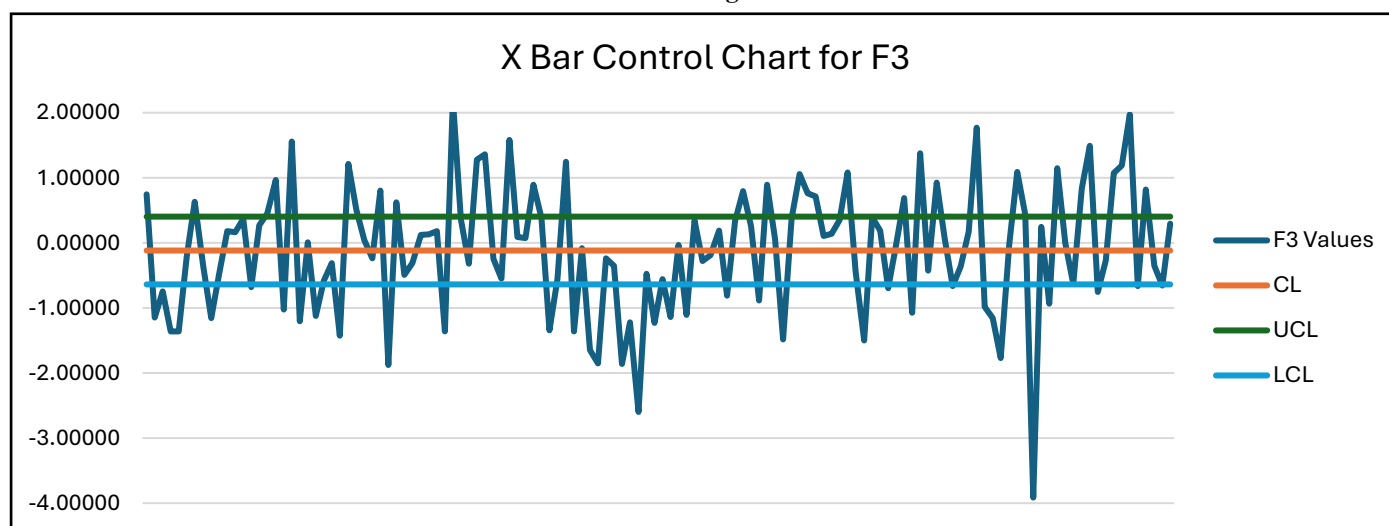


Fig 3

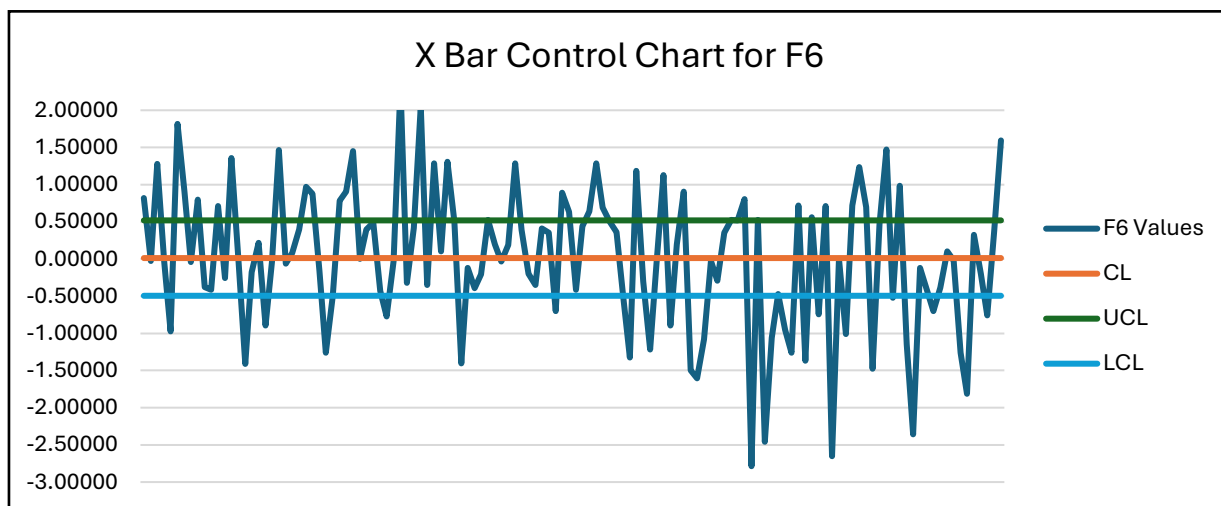


Fig 4

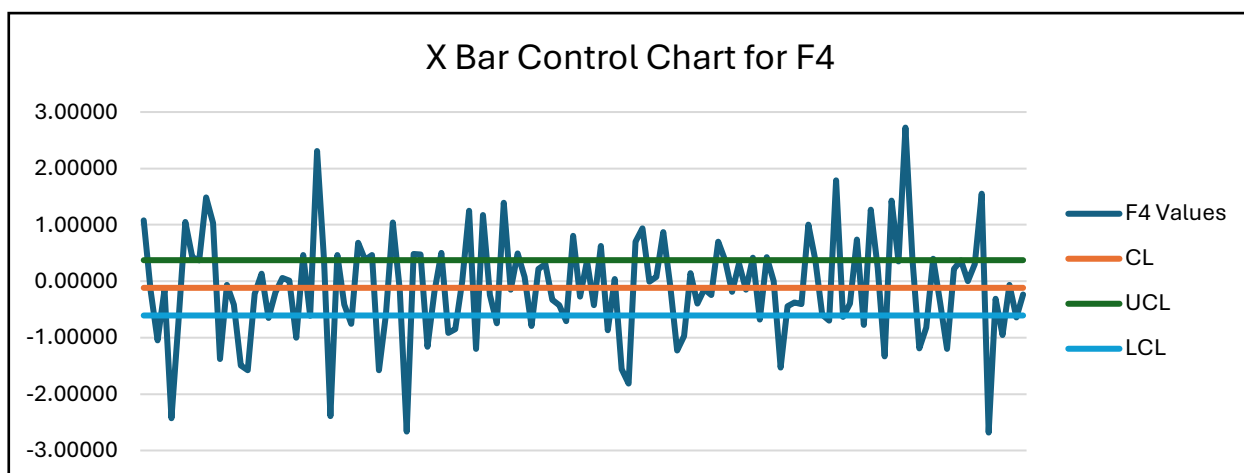


Fig 5

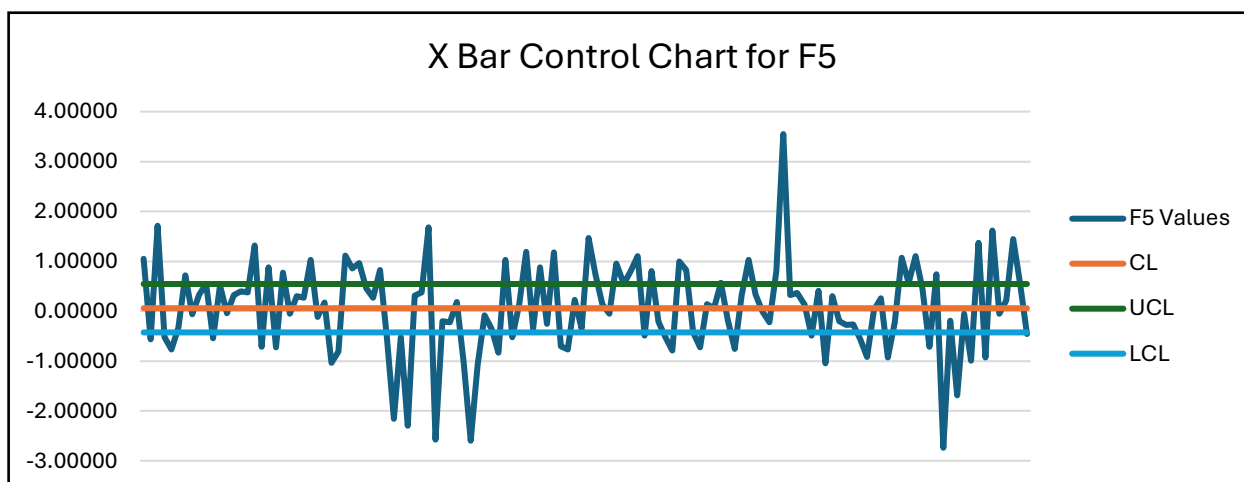


Fig 6



Process Variability is monitored by the Control Chart for standard deviation, the s chart. As we compute s_i , we note that s_i is a biased estimate of an unknown σ . Assuming that the underlying distribution is normal, we compute the correction to the bias as the constant

c_4 as a function of n , given by $c_4 = \sqrt{\frac{2}{n-1}} \frac{(\frac{n-1}{2})!}{(\frac{n-1}{2}-1)!}$ (Schenkelberg)

The Variability Control Chart for Factor F_i is then given by Control Limit $CL(s)_i = \bar{s}_i$ and the Upper Control Limit, $UCL(s)_i$ and the Lower Control Limit, $LCL(s)_i$ are given by $\bar{s}_i \pm \frac{3\bar{s}}{c_4} \sqrt{1 - c_4^2}$

We note that $c_4 = 0.5019$ (Schenkelberg)

The computations of the s chart are shown in Table 3 below.

Sample	Parameter or Statistic	F1	F2	F3	F4	F5	F6
Sample S of size 128	Standard Deviation, s	0.8999	0.9860	0.9816	0.9246	0.9156	0.9560
Sample S1 of size 32	Sample Standard Deviation, s1	0.9088	0.9300	0.8607	1.0294	0.6975	0.8091
Sample S2 of size 32	Sample Standard Deviation, s2	0.7873	0.8767	1.0871	0.8662	1.0480	0.7723
Sample S3 of size 32	Sample Standard Deviation, s3	0.7568	0.8147	0.7229	0.6958	0.8212	1.0224
Sample S4 of size 32	Sample Standard Deviation, s4	1.0847	1.1561	1.1619	1.0499	0.9183	1.0547
$\bar{s}_i = CL(s)_i$		0.8875	0.9527	0.9628	0.9132	0.8801	0.9229
c_4	0.5019						
$UCL(s)_i$		5.4758	5.8781	5.9407	5.6342	5.4303	5.6943
$LCL(s)_i$		-3.7008	-3.9727	-4.0150	-3.8079	-3.6701	-3.8484

Table 3

FINDINGS & CONCLUSION

It is seen here that the initial control charts show a process in control. However, the charts are depicting the initial phase wherein customer satisfaction data is examined from the construct created from the original feedback. Thus, the process would need to be repeated with revised data on the factors: F1, ..., F6 and checked for control and detection of outliers using run length, Mahalanobis Distance or the Tukey Model. The fit of the model would need to be checked with the data. Also, in case of revision of the Control Charts on the said factors is made and yet the process does not remain in control, the organization could revise the initial construct based on a revised set of data, and the revision of an underlying construct after a re-examination of customer satisfaction with the 22 item SERVQUAL instrument. The simplistic suggested loop may be as depicted in Figure 7.

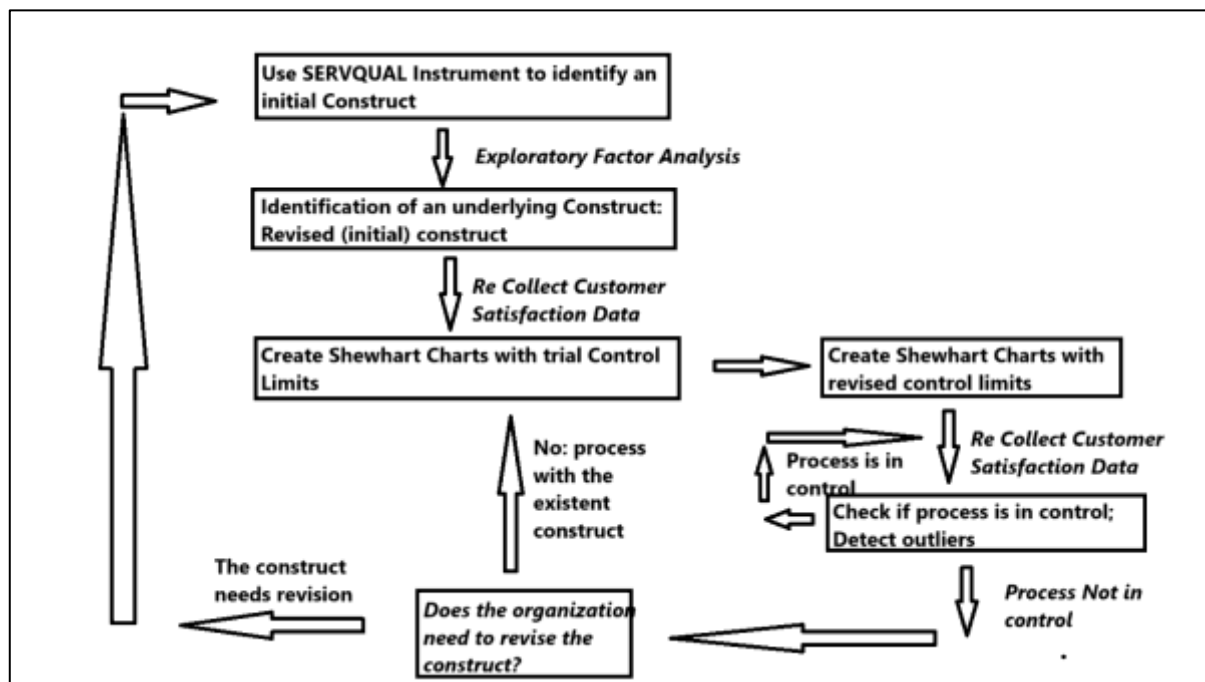


Figure 7

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ECONOMICS OF INTEGRAL HUMANISM: DEENDAYAL UPADHYAYA'S VISION FOR SUSTAINABLE DEVELOPMENT

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ABSTRACT

Deen Dayal Upadhyaya, an Indian philosopher, political thinker and economist, introduced the concept of Integral Humanism as an alternative to Western economic models and prevailing political ideologies in India. His philosophy emphasizes a holistic approach to human development, blending material progress with spiritual well-being. Integral Humanism challenges the consumer-driven economic frameworks of the West, which prioritize profit maximization and unchecked growth, by advocating for a balanced development model that nurtures both material and spiritual growth. Upadhyaya's economic vision critiques both capitalist and socialist systems. Capitalism, driven by consumerism and profit, leads to inequality, exploitation of labour and environmental degradation. Socialism, on the other hand, centralizes control, suppresses individual freedoms, and stifles creativity. Integral Humanism presents an alternative by emphasizing self-reliance, decentralized production, and ethical values. In this model, local communities and individuals have control over resources, reducing dependency on external forces and fostering a sense of ownership and responsibility. A core element of Integral Humanism is sustainability, which extends beyond ecological balance to include economic, social and cultural sustainability. Upadhyaya envisioned a development model that does not exploit natural resources or marginalized communities. He sought a harmonious coexistence between nature and human civilization, where growth is measured by the well-being of all citizens, particularly those in rural areas. Upadhyaya believed rural development should be central to India's development strategy, as the majority of the population resides in rural areas. Decentralized production systems are key to this model. By empowering local communities to produce goods locally, wealth can be distributed more evenly and economic activities can align with local needs, reducing environmental impact. This model counters the negative effects of long supply chains and resource wastage seen in centralized systems. Upadhyaya's economic thought remains relevant today in addressing challenges such as poverty, economic inequality, and environmental degradation. His emphasis on self-reliance, sustainable development, and ethical living provides a framework for policies that prioritize human dignity, social justice and ecological balance over unchecked profit maximization.

KEY-WORDS: *Integral Humanism, Self-reliance, Sustainability, Decentralized production, Human dignity and Social Justice*

INTRODUCTION

Deendayal Upadhyaya, born on September 25, 1916, in Nagla Chandrabhan, Uttar Pradesh, was an influential thinker, philosopher and politician whose ideas have had a profound impact on post-independence India. His most notable contribution was his philosophy of Integral Humanism, introduced in 1965, which offered a distinctive vision for India's development. This philosophy emphasized a holistic approach to human development, advocating for the integration of material, spiritual, social, and cultural progress. Unlike Western capitalism and Marxist socialism, which Upadhyaya critiqued for their failure to address the complete well-being of humanity, Integral Humanism proposed a balanced development model that respects human dignity, social justice, and ecological sustainability. Upadhyaya believed that true prosperity could not be measured solely by material wealth; it needed to encompass spiritual and cultural growth, environmental sustainability, and the well-being of all sections of society, particularly the marginalized. As a member of the Rashtriya Swayamsevak Sangh (RSS) and later the Janata Party, Upadhyaya championed the cause of integrating India's traditional values into modern development. He was critical of Western economic models, seeing them as exploitative and divisive. Upadhyaya argued that both capitalism and socialism, though widely regarded as paths to progress, failed to address the needs of all people. Capitalism, according to Upadhyaya, prioritized individual profit, consumerism, and resource exploitation, resulting in inequality, social fragmentation, and environmental degradation. On the other hand, socialism, with its centralized control and focus on state ownership, stifled individual creativity, freedom, and initiative. Instead of adhering to these models, Upadhyaya advocated for a decentralized approach to development where local communities, particularly villages, played a central role in decision-making processes. The essence of his vision was self-reliance. Upadhyaya believed that India's development should not depend on foreign aid or influence, but on the empowerment of its people at the grassroots level. He envisioned a system where local communities controlled their own resources and production processes, fostering a sense of ownership and responsibility. This decentralized approach, in Upadhyaya's view, would not only reduce dependence on external forces but also promote sustainable economic practices that respected the environment. He warned against the unchecked industrialization that could lead to environmental degradation, emphasizing that economic progress must go hand in hand with ecological preservation. Social justice was another core component of Upadhyaya's philosophy. He stressed that economic systems should aim to uplift the poor and marginalized, particularly in rural areas. Upadhyaya's focus on rural development addressed the



growing urban-rural divide, advocating for policies that would ensure equitable access to resources and opportunities for all. His ideas about development resonate even today, offering a sustainable model that integrates economic, social, and environmental considerations. Upadhyaya's philosophy remains highly relevant in contemporary India, as policymakers and activists continue to search for a development model that prioritizes human dignity, ecological sustainability and social equity, rather than the profit-driven motives of traditional economic systems.

REVIEW OF LITERATURE

The reviews of literature provide a comprehensive understanding of how Deen Dayal Upadhyaya's Integral Humanism offers a unique framework for sustainable development. Each study contributes to understanding the various dimensions of his economic thought from decentralization and self-reliance to social justice and ecological sustainability. Upadhyaya's ideas resonate strongly with contemporary challenges, particularly in addressing inequality, poverty and environmental degradation, offering a path forward for creating an inclusive and sustainable economy in India.

Verma (2015) conducted a study on Deen Dayal Upadhyaya's vision of economic self-reliance and decentralization. He concluded that Upadhyaya's concept of economic decentralization was crucial for building a more equitable society. Verma's analysis highlighted how Upadhyaya's rejection of centralized state control and his advocacy for rural empowerment and decentralized economic systems provided a distinctive model for sustainable development. The study connected these ideas to India's contemporary economic issues, such as rural underdevelopment, unemployment, and environmental degradation. He suggested that implementing self-reliance at the local level could address the over-reliance on urban industrial sectors and encourage sustainable, community-driven growth. He emphasized that Upadhyaya's model offered an alternative to both socialist and capitalist systems, focusing on grassroots development and long-term sustainability.

Gupta (2017) examined the study on Sustainable Development and Deen Dayal Upadhyaya's Integral Humanism, exploring how Upadhyaya's philosophy aligned with contemporary ideas of sustainable development. He emphasized that Upadhyaya's holistic approach to human development went beyond materialism, focusing on the well-being of both individuals and society. He concluded that Upadhyaya's critique of Western materialism highlighted that sustainability could not be confined to environmental concerns but needed to encompass economic, social and spiritual dimensions. The study explored how Upadhyaya's principles of ecology, ethics and social justice could contribute to modern sustainability practices in India. By advocating for a balance between economic growth and environmental stewardship, Upadhyaya's vision was seen as a precursor to contemporary concepts of green and inclusive development, offering a more holistic approach to sustainable development.

Mishra (2018) conducted a study on "Deen Dayal Upadhyaya's Concept of Antyodaya: Implications for Sustainable Economic Development," focusing on the concept of Antyodaya (upliftment of the last person) within the framework of Integral Humanism and its impact on sustainable development. He analysed how this principle could guide policies aimed at addressing economic inequality, especially for the poorest and most marginalized groups. He argued that true development must be inclusive and ensure the welfare of the disadvantaged, linking Antyodaya with modern approaches to inclusive growth, poverty alleviation and social justice. He concluded that Upadhyaya's emphasis on addressing the needs of the marginalized through equitable economic policies could contribute to a more sustainable and just society, aligning with contemporary ideas of poverty alleviation and social justice.

Sharma (2019) examined a study on "The Economic Philosophy of Integral Humanism: Relevance in Contemporary India," focusing on the ongoing relevance of Upadhyaya's economic ideas in today's Indian socio-economic context. The core principles of Integral Humanism, such as economic justice, rural empowerment, and decentralization, had significant implications for contemporary policy, particularly in addressing poverty and inequality in India. He found that Upadhyaya's approach challenged both capitalist profit maximization and centralized socialist planning, proposing a balanced method that considered human dignity and ecological balance. He highlighted views on local economies, self-reliance and equitable resource distribution provided a roadmap for sustainable development in India. Integral Humanism's emphasis on economic justice and social equity was seen as essential for tackling modern challenges of poverty and inequality.

Yadav (2020) studied "Ecological Sustainability and Economic Growth: Deen Dayal Upadhyaya's Ethical Approach," focusing on the intersection of ecology and economic growth in Upadhyaya's philosophy. The study examined how Upadhyaya's rejection of unregulated industrialization and his advocacy for environmentally responsible economic growth offered a pathway for sustainable development. He concluded that Integral Humanism emphasized the need for economic activities to align with nature, a principle that was highly relevant in today's climate crisis. He highlighted how Upadhyaya's promotion of industries respecting ecological limits, such as organic farming, sustainable energy, and eco-friendly production methods, could provide an alternative to the destructive patterns of industrialization. The importance of integrating ethical values into economic decisions, advocating for a balance between economic growth and environmental sustainability for a sustainable future.



OBJECTIVES OF THE STUDY

The objective of this study is to explore the economic philosophy of Deen Dayal Upadhyaya through the lens of Integral Humanism and assess its applicability to sustainable development in modern India. The specific objectives of the study are as follows:

1. To examine the concept of sustainable development within the framework of Integral Humanism.
2. To explore the relevance of Integral Humanism in addressing contemporary challenges such as poverty, inequality and environmental degradation.
3. To identify the practical applications of Integral Humanism in current Indian economic policies.

METHODOLOGY/ RESEARCH DESIGN

The research utilized secondary data to explore Deen Dayal Upadhyaya's economic philosophy of Integral Humanism and its relevance to sustainable development in India. The study was based on historical documents, academic papers, policy reports and relevant literature that analysed Upadhyaya's ideas on economic self-reliance, decentralization, and ecological sustainability. Data sources included books, articles and reports by economists, political analysts and scholars who had studied Upadhyaya's work. The research analysed key texts, including Upadhyaya's writings and policy recommendations, to understand his critique of both capitalist and socialist economic systems and his proposed alternative for India's development. The study focused on Upadhyaya's concepts of human dignity, social justice, rural development and sustainable growth. Additionally, the research assessed contemporary Indian policies and development frameworks to evaluate how Integral Humanism could guide modern economic policies. By examining these sources, the research aimed to provide insights into the applicability of Upadhyaya's economic ideas in addressing current issues like inequality, environmental degradation and unsustainable growth patterns in India today.

SIGNIFICANT RESULTS

1. Examining the Concept of Sustainable Development within the Framework of Integral Humanism: Sustainable development, in the traditional sense, is often framed around the notion of ecological preservation, focusing on minimizing environmental degradation. However, Deen Dayal Upadhyaya's philosophy of Integral Humanism presents a more holistic and inclusive concept of sustainability. According to Upadhyaya, true sustainable development goes beyond environmental concerns to also encompass moral, social, and spiritual well-being. His vision integrates economic, social and ecological dimensions of growth, with an emphasis on justice, equity and long-term ecological balance. The Integral Humanism's concept of sustainable development can guide contemporary policy decisions in India and beyond, aiming at more equitable and ecologically sound growth.

The Holistic Approach of Integral Humanism: Integral Humanism, proposed by Upadhyaya in the 1960s, emphasizes that human beings are not merely economic agents but also spiritual, social, and cultural entities. This perspective challenges both capitalist and socialist economic models, which often focus on material wealth or state control without giving due consideration to spiritual and cultural aspects of human life. Sustainable development, in the context of Integral Humanism, is not just about fostering economic growth but about achieving a balance between material progress and the spiritual, social, and ethical health of individuals and communities. Upadhyaya's idea of sustainable development takes a long-term perspective, arguing that development must be aligned with human dignity and should prioritize equity and justice. The focus is not on GDP growth alone but on improving the quality of life for all, especially marginalized groups, by promoting self-reliance, rural empowerment and decentralized economic systems. This kind of development requires a commitment to ensuring that the benefits of growth are shared equitably across society, addressing the needs of the poor and disadvantaged, especially those living in rural areas.

Key Components of Sustainable Development in Integral Humanism

(i) Social Justice and Equity: Integral Humanism stresses the importance of social justice and equitable distribution of resources. Upadhyaya's concept of Antyodaya highlights the need to focus on the welfare of the poorest and most marginalized sections of society. For sustainable development, the objective is not only to raise the economic profile of the country as a whole but to ensure that no one is left behind. Upadhyaya advocated for a model that would empower local communities, promote rural development, and reduce the disparities between urban and rural areas. In this sense, sustainable development within the framework of Integral Humanism is deeply tied to social justice, with a focus on eliminating poverty and inequality.

(ii) Ecological Sustainability: Environmental sustainability is also a central tenet of Integral Humanism, but it extends beyond simple conservation. Upadhyaya rejected the notion of unregulated industrialization, which often leads to environmental degradation. Instead, he proposed that economic activities must respect ecological limits. Industries that promote ecological balance such as organic farming, sustainable energy, and eco-friendly production methods were seen as essential to the idea of a sustainable economy. Upadhyaya's ideas suggest that a balance between development and nature can be achieved by encouraging responsible consumption and promoting green technologies.

(iii) Economic Self-Reliance and Decentralization: A critical component of sustainable development in Integral Humanism is economic self-reliance, particularly at the local level. Upadhyaya criticized the over-dependence on external markets and centralized



economic systems. He believed that decentralized economic activities, where communities take control of their resources, would foster a sense of ownership, responsibility, and sustainability. This local empowerment, according to Upadhyaya, would not only reduce inequalities but also make economic systems more resilient in the face of global challenges. This approach encourages the development of small-scale industries and the promotion of self-sustaining rural economies, which can minimize environmental impacts caused by large-scale industrialization.

(iv) Relevance to Contemporary Policy: In the current context, where India and other developing nations are grappling with challenges like poverty, unemployment, environmental degradation, and rising inequality, the framework of Integral Humanism offers valuable insights. Current policy approaches often focus heavily on economic growth without adequate attention to its social and environmental costs. Upadhyaya's vision offers a model of sustainable development that can guide policy decisions toward more inclusive and balanced growth. By focusing on the welfare of the marginalized, promoting environmental responsibility, and advocating for decentralized economic systems, Integral Humanism provides a roadmap for policies that are not only sustainable in the ecological sense but also socially equitable and ethically sound. For instance, India's push towards sustainable development goals (SDGs) can be better aligned with Upadhyaya's ideas by prioritizing rural development, promoting ethical industries, and ensuring equitable distribution of resources. In a country where rural areas remain underdeveloped and disproportionately affected by poverty, Upadhyaya's emphasis on rural empowerment and self-reliance offers practical solutions for inclusive growth. Additionally, by encouraging sustainable practices in agriculture, renewable energy and local production systems, his philosophy can help mitigate the adverse effects of industrialization and contribute to a more resilient and just economy.

2. The Relevance of Integral Humanism in Addressing Contemporary Challenges: Poverty, Inequality and Environmental Degradation: Deen Dayal Upadhyaya's philosophy of Integral Humanism offers a unique framework for addressing the contemporary challenges of poverty, inequality, and environmental degradation. Introduced in the 1960s, Integral Humanism advocates for a balanced and holistic approach to development, combining economic, social, and ecological considerations. While India, and the world at large, continue to grapple with these persistent issues, Upadhyaya's ideas provide an alternative pathway to foster inclusive economic growth and sustainable practices that prioritize human dignity, social equity and environmental responsibility.

(i) Addressing Poverty through Inclusive Development: One of the central tenets of Integral Humanism is the focus on human dignity and social justice. Upadhyaya's concept of Antyodaya, or the upliftment of the last person, emphasizes that true development must ensure the welfare of the most marginalized sections of society. In modern-day India, where approximately 28.00 percent of the population still lives below the poverty line (as per the World Bank's latest data), Upadhyaya's ideas hold significant relevance. His vision of poverty alleviation does not merely focus on increasing income levels but on creating opportunities for self-reliance, skill development and the empowerment of rural and marginalized communities. The current economic model, which often prioritizes GDP growth at the cost of social well-being, has exacerbated income disparities. Upadhyaya rejected both capitalist models, which lead to increasing inequality and exploitation, and socialist systems, which sometimes centralize control at the cost of individual freedoms. His emphasis on decentralized production, local entrepreneurship, and community-based development models holds the potential to empower impoverished communities, reduce dependence on external forces, and encourage local solutions to poverty. By promoting rural self-reliance and grassroots development, the economic ideas of Integral Humanism can help reduce poverty, improve livelihoods, and create sustainable, long-term solutions for the most disadvantaged populations.

(ii) Combating Inequality through Equitable Resource Distribution: Economic inequality remains one of the most pressing issues in both developing and developed countries. In India, the gap between the rich and poor has been widening, with the wealthiest 1.00 percent of Indians owning more than 40.00 percent of the nation's wealth (Oxfam, 2023). This growing inequality threatens social stability and hinders inclusive growth. Upadhyaya's vision for an equitable society is rooted in the belief that economic policies must be designed to ensure fair and just distribution of resources. Integral Humanism critiques both the concentration of wealth in capitalist economies and the stifling state control in socialist systems. Instead, Upadhyaya advocated for decentralized economic systems where local communities have control over resources, production and consumption. By promoting small-scale, localized industries, agricultural cooperatives, and self-sustaining villages, Integral Humanism offers a framework for reducing economic disparities and empowering marginalized populations. Moreover, Upadhyaya's emphasis on *Dharma* (ethical responsibility) ensures that economic growth is not achieved at the expense of others' rights. This aligns with contemporary calls for redistributive policies such as universal basic income (UBI), land reforms, and better access to education and healthcare, all of which can play a vital role in addressing inequality. In India, where inequality is rooted in both income disparities and caste-based discrimination, Upadhyaya's philosophy calls for a system where social equity and respect for human dignity are paramount.

(iii) Environmental Sustainability: A Holistic Approach to Conservation: Integral Humanism's approach to environmental sustainability offers a timely alternative to the exploitative practices of unchecked industrialization. Upadhyaya was critical of both unregulated capitalism, which leads to overexploitation of natural resources, and the centralized planning seen in socialist



economies. He argued that development must be harmonious with nature, recognizing that human growth and ecological health are intertwined. In contemporary times, environmental degradation and climate change have become major challenges, particularly in India, where rapid industrialization has led to deforestation, water scarcity, and air pollution. According to the World Bank, India is one of the countries most affected by climate change, with its agricultural sector and rural communities bearing the brunt of environmental shocks. Upadhyaya's philosophy calls for a sustainable development model that integrates ecological conservation with economic growth. He advocated for industries that respect ecological limits, such as organic farming, renewable energy, and eco-friendly manufacturing. This approach is in line with current global trends towards green development and sustainability. In India, where agriculture remains the backbone of the economy, Upadhyaya's ideas can guide policies promoting organic farming, water conservation, and sustainable land-use practices. By encouraging local, eco-friendly industries and reducing the dependence on polluting industries, Integral Humanism offers a pathway to balance economic growth with environmental preservation.

(iv) Policy Implications: Adapting Integral Humanism to Modern Needs: Upadhyaya's framework has profound implications for contemporary policy-making, particularly in addressing the interrelated issues of poverty, inequality, and environmental sustainability. For example, policies that prioritize rural development, decentralized production, and community-driven growth are consistent with Integral Humanism. India's push towards self-reliance (Atmanirbhar Bharat) can benefit from Upadhyaya's ideas by focusing on local industries, small-scale agriculture, and renewable energy sources. Additionally, policies aimed at poverty alleviation must focus on empowerment rather than just financial aid. Programs that promote education, vocational training, and the development of local industries can provide long-term solutions to poverty. Furthermore, environmental policies that encourage sustainable land management, renewable energy, and waste reduction align with the ecological principles in Integral Humanism.

3. Practical Applications of Integral Humanism in Current Indian Economic Policies: Deen Dayal Upadhyaya's concept of Integral Humanism provides a holistic framework for addressing the intertwined challenges of rural development, environmental sustainability, and economic equity. Integral Humanism emphasizes the need for balanced development that integrates material, social, and spiritual growth, ensuring that policies not only foster economic progress but also promote social justice, human dignity, and ecological preservation. This paper examines the practical applications of Integral Humanism in current Indian economic policies, focusing on rural development, environmental sustainability, and economic equity and assesses how these initiatives align with Upadhyaya's economic vision.

(i) Rural Development: Empowering the Backbone of India: Integral Humanism emphasizes the importance of empowering rural communities and promoting self-reliance. Upadhyaya's vision of rural development is centered around decentralized economies and local empowerment. The majority of India's population still resides in rural areas, with over 66% of the population living in villages (Census 2011). However, rural areas have long faced challenges such as poor infrastructure, lack of access to basic services, and dependence on agriculture, often exacerbated by inadequate government intervention. Several current Indian policies reflect Integral Humanism's emphasis on rural empowerment. One notable initiative is the Pradhan Mantri Gram Sadak Yojana (PMGSY), which focuses on improving rural connectivity through the construction of all-weather roads. This policy aims to reduce rural isolation, improve access to markets, healthcare, and education, and thereby stimulate local economies. Additionally, the Pradhan Mantri Awas Yojana (PMAY) focuses on providing affordable housing to the rural poor, aiming to ensure shelter for all by 2024. These policies support self-reliance by empowering rural communities to overcome infrastructure and housing challenges, which are key to economic development. However, to fully align with Integral Humanism, these policies can be strengthened by incorporating elements that focus on local production, agro-based industries, and skill development, which will reduce dependency on urban industries. Initiatives such as the Rural Livelihoods Mission (NRLM) and the Deen Dayal Upadhyaya Grameen Kaushalya Yojana (DDU-GKY) aim to provide skill training and employment to rural youth, promoting local entrepreneurship and self-sustenance, reflecting Upadhyaya's vision of decentralized economic growth.

(ii) Environmental Sustainability: Green Growth for Future Generations: Upadhyaya's economic philosophy stresses the need for economic growth to be in harmony with nature. He believed that unchecked industrialization and exploitation of natural resources were detrimental to both society and the environment. This focus on environmental sustainability is especially pertinent in the face of India's escalating environmental crises, including air pollution, water scarcity, and deforestation. The National Action Plan on Climate Change (NAPCC) and its eight national missions, such as the National Mission for Enhanced Energy Efficiency and the National Mission on Sustainable Agriculture, echo Upadhyaya's call for environmentally responsible growth. These missions aim to reduce India's carbon footprint, promote renewable energy, and encourage sustainable farming practices, aligning with Integral Humanism's ecological vision. Additionally, the Pradhan Mantri Ujjwala Yojana (PMUY), which provides LPG connections to rural households, aims to reduce the reliance on traditional biomass fuels, improving both the health and environment of rural communities. Similarly, the Swachh Bharat Mission focuses on sanitation, waste management, and cleanliness, encouraging more sustainable and hygienic practices. However, India still faces significant environmental challenges. Air pollution in urban areas is a growing concern, with India being home to 22 of the world's 30 most polluted cities (World Air Quality Report, 2020). To better



align with Integral Humanism, policies could further focus on green technology adoption, reducing industrial pollution, and promoting eco-friendly farming methods like organic agriculture, which can empower local farmers while safeguarding the environment.

(iii) Economic Equity: Ensuring Fair Distribution of Wealth: Integral Humanism emphasizes economic justice, ensuring equitable wealth distribution. Upadhyaya argued for a society in which economic development does not lead to exploitation or inequality. In India, rising income inequality and the concentration of wealth in urban areas remain pressing issues. According to the Oxfam India Inequality Report 2020, the richest 1.00 percent of Indians own 42.50 percent of the country's wealth, while the bottom 50.00 percent own only 2.30 percent. This growing inequality threatens social stability and economic inclusion. Current policies such as Mahatma Gandhi National Rural Employment Guarantee Act (MGNREGA), which provides guaranteed employment to rural households and Jan Dhan Yojana, aimed at providing financial inclusion through bank accounts for the unbanked, reflect Integral Humanism's commitment to economic equity. MGNREGA, by guaranteeing 100 days of wage employment to rural households, promotes inclusive growth by providing livelihood support to the rural poor, particularly women and marginalized communities. Moreover, Atmanirbhar Bharat Abhiyan (Self-Reliant India Campaign) is an initiative aimed at boosting local production and reducing dependence on imports, which reflects Upadhyaya's vision of local self-reliance. The campaign includes support for micro, small, and medium enterprises (MSMEs), which are critical to fostering inclusive economic growth. To strengthen these policies and fully align them with Integral Humanism, India needs to focus on ensuring that the benefits of growth are equitably distributed. Policies should be designed to provide better access to education, healthcare and social security, particularly for the marginalized. Furthermore, empowering rural communities with access to technology, credit, and infrastructure can create a more equitable economic landscape, addressing disparities between urban and rural areas.

Challenges in implementing Upadhyaya's concepts of Integral Humanism and holistic Sustainable Development:

(i) Challenges of Implementing Holistic Development in Practice: Implementing holistic development, which incorporates moral, social, and spiritual dimensions alongside economic and ecological sustainability, requires substantial investment in human capital, societal awareness, and institutional change. A 2021 study on sustainable development in India highlighted significant barriers to integrating these elements. For instance, the National Strategy for Sustainable Development Goals (SDGs) emphasizes the challenges of incorporating social and environmental considerations into economic growth, often resulting in conflicting policy priorities. According to a UNDP report, governments tend to prioritize short-term economic gains, such as GDP growth and infrastructure projects, over long-term, inclusive policies. This misalignment is particularly pronounced in India, where rapid population growth and poverty place significant pressure on resources, limiting room for social, moral, and spiritual integration. Moreover, political pressures, global trade demands, and competition often overshadow social welfare initiatives, creating institutional and societal resistance, particularly in rural areas where entrenched systems and social hierarchies prevail.

(ii) Tension Between Local Self-Reliance and Global Interdependence: The concept of local self-reliance often conflicts with the demands of global trade and technological advancements. According to World Trade Organization (WTO) reports, global trade constitutes a significant portion of GDP in developing economies like India, where exports account for approximately 20.00 percent of GDP. While Upadhyaya's advocacy for local self-reliance seeks to build resilient, decentralized economies, global interdependence necessitates market openness and integration. A 2020 study by the Indian Institute of Foreign Trade (IIFT) highlights that small and medium enterprises (SMEs) in India, which could benefit from local self-reliance, face significant challenges in competing globally without access to technology transfers, infrastructure, and international markets. These SMEs often struggle to achieve economies of scale, limiting their ability to thrive independently. Key constraints include the need to integrate into global supply chains for economic growth, gaps in technology and innovation, and the economic inefficiency of pursuing complete self-reliance, which hampers global competitiveness and growth.

(iii) Potential Conflict Between Social Justice and Market Dynamics: Upadhyaya's focus on social justice seeks to empower marginalized groups, but market dynamics in a competitive global economy often prioritize efficiency and productivity over equity. A 2019 World Bank report reveals that economic growth driven by market forces tends to exacerbate income inequality, as seen in India, where the top 10% of the population controls nearly 77% of the total wealth. While policies like the Pradhan Mantri Jan Dhan Yojana (PMJDY) and MGNREGA aim to promote financial inclusion and employment for marginalized groups, they have been criticized for not addressing deeper structural inequalities. These programs, while offering temporary relief, fail to tackle issues such as land ownership, power dynamics, and social mobility. Key constraints include capitalism's tendency to widen wealth gaps, the limited impact of welfare programs in addressing systemic barriers, and cultural and social barriers like entrenched hierarchies and discrimination, which hinder progress toward true social justice and equity.

(iv) Ecological Sustainability vs. Economic Growth: A major challenge in achieving ecological sustainability while pursuing economic growth is the tension between industrialization and environmental preservation. India's Environmental Performance Index (EPI) 2020 ranks the country 168th out of 180 nations, highlighting the ongoing struggle to balance industrial expansion with



ecological protection. Issues like air and water pollution, waste management, and biodiversity loss persist despite efforts to promote renewable energy and conservation. The promotion of industries such as organic farming and renewable energy, though environmentally beneficial, faces obstacles due to infrastructure deficiencies, high initial investments and a lack of market incentives. A 2021 study by the Indian Ministry of Environment emphasized that transitioning to renewable energy in rural areas requires extensive infrastructure and financial support, often sidelined due to short-term economic pressures. Key constraints include short-term growth priorities, infrastructure gaps, and resistance from business and industrial interests who prioritize profitability over environmental regulations, hindering the adoption of sustainable practices.

(v) Difficulty in Achieving Rural Empowerment at Scale: Achieving rural empowerment at scale in India remains a significant challenge, as rural areas, which make up over 65% of the population, continue to face substantial development gaps. According to India's National Rural Livelihood Mission (NRLM), these areas struggle with barriers like inadequate infrastructure, limited access to credit and weak local governance. While programs like MGNREGA aim to provide employment and uplift rural communities, they have been criticized for limited outreach, delays in wage disbursement, and ineffective monitoring. A 2020 report by the Centre for Policy Research found that although MGNREGA has created millions of jobs, it has not generated sustainable long-term rural development or addressed social hierarchies. Key constraints include infrastructure gaps that hinder self-reliance and growth, caste-based discrimination that excludes marginalized groups from the benefits of development and the poor implementation and accountability of rural programs, which limit their impact on long-term empowerment. These challenges must be addressed for effective rural development.

Suggestions to address the challenges of implementing holistic development: To address the challenges of implementing holistic development, it is essential to invest in education, strengthen infrastructure, promote inclusive policies, enhance institutional capacity, foster community engagement, align economic growth with sustainability, and implement social reforms targeting marginalized groups.

(i) Integrate Long-Term Sustainable Goals with Immediate Economic Priorities: Policies should be created to align economic growth with sustainable development by integrating long-term environmental, social, and spiritual goals into national and state-level frameworks. Strengthening inter-ministerial coordination and incorporating SDGs into governance at all levels will bridge the gap between economic growth and holistic development. This approach can balance competing priorities, fostering an inclusive, long-term model of development.

(ii) Enhance Institutional Capacity for Holistic Development: Investing in the professional development of civil servants, local leaders, and institutional frameworks is essential to equip them with the skills needed for policies that integrate social, moral, and ecological considerations. Creating dedicated units within government agencies focused on sustainable development improves institutional accountability. As the UNDP report highlights, strengthening institutional capacity ensures effective implementation of holistic development policies and promotes coordinated governance.

(iii) Promote Policy Synergy Between Local Self-Reliance and Global Trade: Developing hybrid policies that promote local self-reliance in sectors like agriculture and renewable energy while fostering global engagement is crucial. These policies should support technology transfer and help SMEs integrate into global markets, while strengthening local supply chains. The IIFT report highlights that SMEs need proper infrastructure to compete globally and such policies will ensure a balanced approach between self-reliance and global integration.

(iv) Focus on Structural Economic Reforms to Address Income Inequality: Advocating for structural reforms like progressive taxation, land reform, and wealth redistribution is essential to reduce inequality. These reforms should target marginalized communities and encourage businesses to invest in social welfare programs. As highlighted by the 2019 World Bank report, market-driven economies often worsen inequality. Comprehensive policy changes will ensure that economic growth fosters more inclusive and equitable opportunities for all.

(v) Invest in Green Technologies and Sustainable Infrastructure: Increasing investments in green technologies, renewable energy, and eco-friendly infrastructure, especially in rural areas, is crucial for sustainable development. Government subsidies, public-private partnerships, and financing mechanisms can drive this transition in sectors like agriculture, manufacturing, and energy. As noted in the 2021 Ministry of Environment study, investing in infrastructure enables long-term, sustainable solutions that align with economic growth.

(vi) Strengthen Rural Development Programs with Effective Monitoring: Revising rural development programs like MGNREGA is essential to address systemic issues such as delayed wage payments, inadequate infrastructure, and social empowerment. Strengthening monitoring and accountability mechanisms can ensure effective implementation and better reach to



marginalized communities. The Centre for Policy Research report highlights MGNREGA's limited impact, emphasizing the need for structural improvements to achieve more sustainable rural development.

(vii) Foster a Cultural Shift Toward Holistic Development: Promoting awareness campaigns and community-based programs can educate the public on holistic development's benefits. Involving local leaders, NGOs, and community organizations is crucial to integrating moral, social, and ecological aspects into daily life. Additionally, addressing caste-based discrimination and empowering marginalized groups can overcome cultural resistance. A culturally sensitive approach that includes community leaders can drive acceptance of holistic development policies.

MAIN FINDINGS

(i) Holistic Sustainable Development: Upadhyaya's concept of sustainable development extends beyond environmental concerns to include moral, social, and spiritual well-being. His vision advocates for balanced growth, incorporating justice, equity, and ecological sustainability.

(ii) Human-Centered Development: Integral Humanism stresses that human beings are not only economic agents but also social, spiritual, and cultural entities. Sustainable development, from this perspective, involves improving the quality of life in material, social, and spiritual dimensions.

(iii) Social Justice and Equity: A core component of Integral Humanism is social justice, with a focus on empowering the most marginalized groups through equitable resource distribution. Upadhyaya's concept of Antyodaya stresses that development must uplift the poorest and most disadvantaged.

(iv) Ecological Sustainability: Upadhyaya's philosophy advocates for an economic model that respects ecological limits, promoting sustainable industries like organic farming and renewable energy. Environmental sustainability is integral to achieving long-term, holistic development.

(v) Decentralized Economic Systems: Upadhyaya championed economic self-reliance, especially at the local level. He criticized both capitalist and socialist economic models and emphasized decentralized, community-based development as a means of fostering sustainability and equity.

(vi) Rural Empowerment: Integral Humanism places significant importance on rural development, advocating for local self-reliance. Policies supporting rural infrastructure, such as improved connectivity and affordable housing, reflect this vision and are crucial for inclusive growth.

(vii) Balance Between Development and Nature: Upadhyaya emphasized the need for harmony between economic growth and nature. His vision rejects unchecked industrialization and promotes responsible consumption and eco-friendly practices that align with ecological conservation.

(viii) Self-Reliance and Local Empowerment: Integral Humanism stresses self-reliance at the local level. By promoting local industries, skill development, and decentralized economic activities, communities can become more resilient and less dependent on external markets.

(ix) Relevance to Contemporary Challenges: Upadhyaya's philosophy offers practical solutions for addressing pressing issues like poverty, inequality, and environmental degradation. His ideas remain highly relevant for creating policies that prioritize social justice, equitable resource distribution, and environmental sustainability.

(x) Policy Alignment and Recommendations: Current Indian policies like MGNREGA, Atmanirbhar Bharat and the National Action Plan on Climate Change reflect elements of Integral Humanism. However, these policies can be strengthened by incorporating more emphasis on local self-reliance, equitable wealth distribution, and environmental responsibility, in alignment with Upadhyaya's holistic vision.

CONCLUSION

Deen Dayal Upadhyaya's concept of sustainable development, rooted in Integral Humanism, presents a holistic alternative to conventional development models. His vision calls for a balanced approach, integrating material progress with spiritual, social, and ecological well-being. Central to this philosophy is the belief that true development must go beyond economic growth to ensure justice, equity and ecological sustainability. Upadhyaya's emphasis on self-reliance and decentralized, community-driven development provides a framework for addressing the interconnected challenges of inequality, environmental degradation, and



unsustainable growth. In today's world, where these issues are increasingly pressing, Integral Humanism offers valuable lessons for crafting policies that prioritize human dignity, social justice, and environmental stewardship. In the context of rural development, environmental sustainability, and economic equity, Integral Humanism remains highly relevant. By focusing on empowering local communities, promoting equitable resource distribution, and protecting the environment, Upadhyaya's ideas offer a pathway toward inclusive and sustainable growth. While India's current policies reflect elements of this framework, there is potential to strengthen initiatives by promoting decentralized economies, green technologies, and more equitable resource allocation. By embracing a human-centered approach to policy-making, India can move closer to achieving the comprehensive, sustainable development envisioned by Upadhyaya, fostering a just, prosperous, and sustainable future for all.

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A RESEARCH STUDY ON THE IMPACT OF WORKING COUPLES FOR SOCIALIZATION OF CHILDREN IN NUCLEAR FAMILY

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ABSTRACT

The Improvement and Renovation of work relationships is the number one mechanism for powerful socialization, yet rising paintings relationships in early socialization are fragile. We hypothesize that their persistence is related to frequency of records-based help among beginners and assist carriers and perceived responsiveness of guide carriers. We contrast this relational effect with a greater mounted impact of organizational socialization practices. In a have longitudinal study of inexperienced persons involved in a work relationships, We examined the endurance of newbies' data-support relationships over the years. We found support for disagreeing that the endurance of records-support relationships is undoubtedly associated with the frequency of information aid that freshmen receive from their support providers. Moreover, we show that the endurance of information-assist relationships relies upon on relational factors – the perceived willingness of a support provider to provide informational guide, whilst favourable socialization techniques as perceived with the aid of learners do no longer play a great role. We speak theoretical and realistic implications.

KEYWORDS: *I-Improvement, M-Mechanism, S-Socialization, W-Willingness, L-Learner*

INTRODUCTION

Such effect, research suggests, may be both bad as well as high-quality: conflict which stems from work and which spills over into the family as well as war which stems from the home and which spills over into work have each been proven to have consequences which consist of lower process pleasure, dissatisfaction with the couple relationship, extra probability of wanting to find new employment, more psychological pressure, extended somatic/physical symptoms, better ranges of despair, and extra



People grow through having notable conversations, interacting with others, and discussing new and innovative ideas. The place of business is a fantastic vicinity for these things to happen, specifically thinking about personnel spend so much of their time inside the workplace.

I unpack the building blocks of first-rate tradition, and communicate is on the pinnacle of the list. There are surely one of a kind personalities at paintings in any given workplace surroundings, but we shouldn't use the ones as an excuse to not interact. Formal and casual conversations are each valuable in getting paintings completed, building a sustainable group, and growing the pleasure in work. if you don't have the ability to talk, whether or not it be written, video or in-man or woman you'll usually war with advancing to your career. i love the subsequent studies that "studies discovered that only 4 in ten employees can confidently describe to others what their enterprise does or what its goals are at any given point. Fewer than three in ten report that they may be being communicated with, listened to, and stored within the loop."



Even though this studies specially pertains to organizational communique, it has a lot to do with being social inside the place of business and how that may have an effect on the impact of every employee. Time is valuable and making an investment time in speaking to co-employees approximately work and non-work related subjects is a remarkable way to develop empathy and get to recognise the “why” behind their dispositions.

The extent of socialization within the workplace is significantly depending on the subculture installed with the aid of leadership. some employees turn away at opportunities to get to understand their colleagues inside the administrative center for fear of disappointing bosses who need regular productiveness.

I would argue that the positives of workplace socialization a ways outweigh the negatives. even if interactions aren’t usually “effective”, they construct connections between personnel that assist with collaboration ultimately.

Most of the reasons to searching for out social connections within the place of business, Forbes lists much less stress, extra engagement, and a healthier lifestyles as secondary benefits. For commercial enterprise leaders trying to create healthy groups, both at paintings and in their normal lives, the significance of building relationships with coworkers have to now not be discounted.



The modern have a look at examines the connection between running-elegance mothers’ and fathers’ job autonomy, across the first year of parenthood, and their children’s conduct problems and adaptive talents within the first grade. facts got here from a longitudinal take a look at of a hundred and twenty couples interviewed five times across the transition to parenthood and again whilst the goal baby entered the primary grade. mothers’ task autonomy and fathers’ work hours in the course of the child’s first year of life at once anticipated fewer conduct problems and greater adaptive skills of their kids at 6–7 years of age. For all parents a mediated relationship emerged such that greater task autonomy expected much less parenting overreactivity, which in turn



expected higher child outcomes. figure involvement changed into additionally a big mediator linking task autonomy to kids's adaptive abilities, but now not conduct problems.

In advance, with the joint own family device, elevating a child turned into no difficult feat at all as there had been multiple caregivers for a child other than the mother. Aunts, uncles, grandparents – everybody helped in the upbringing of the children in the circle of relatives. Nuclear households have, however, mushroomed and improved everywhere in the country, leaving operating dad and mom with almost no member of the family to depart their child with. This fashion of parenting came with its very own positives and some downfalls as well. It ends in more adulthood degrees and experience that the mother and father can percentage with their children at the same time as reducing the widespread time that they might have spent with them.

Though each mother and father running has a giant nice final results in the lives of their kids, it comes with some negatives as properly. The bad results of operating mothers on toddler improvement may additionally vary with the working couple, as a whole. permit's examine the negative affects of a operating couple on the child's improvement:

Mental Consequences

With the nuclear circle of relatives fashion, couples ought to pass out into the towns for their jobs. Their parents are unwilling to settle down in the metropolis, leaving their fatherland and babysitting the youngsters. This leaves the dad and mom with little or no guide from their very own households. As a result, they ought to hire nannies or admit their kids in daycare facilities. parents want to be extra careful in selecting daycare and nannies for the kids; otherwise, the fine of attention in the direction of the child is positive to say no with out of doors assist.

There are some of gaps within the current know-how base linking parental employment and youngsters's improvement. First, looking past the simple fact of whether mother and father work or not, we recognise little approximately how the work experiences of employed dad and mom, specifically low-income people who've restricted monetary assets and fewer family-pleasant guidelines than their center-elegance counterparts, form own family life and child improvement. Second, the general public of studies on this area awareness on mothers' employment, overlooking how situations of fathers' jobs are related to children's improvement, at the same time as hired fathers spend extended hours in early infant care . Sooner or later, burgeoning research on child development highlights the primary year of lifestyles as a mainly sensitive period in little one improvement. The primary 12 months of life is a time when paintings situations may additionally play a essential position in shaping employed mother and father' capability to be engaged and touchy caretakers, in the end influencing children's development.

Parental socialization of youngsters's affect and self-regulatory skills is a complex and difficult procedure that entails numerous components of each the determine's behavior closer to the child and the figure-baby courting. Hooked up theoretical views recommend that a baby's potential to regulate emotional states and adaptively respond to converting environmental demands is most in all likelihood prompted through parenting in three domain names: protection, coaching, and manage. Greater specially, mother and father can help facilitate the development of affect and self-law touchy responding to distress, Socialization of emotional information, and steady and developmentally suitable subject . Similarly, a child's capability to practice self-regulatory skills early in life depends on internalized conceptualizations of safety and dependability in near relationships .





The development of have an effect on and self-regulation competencies is aided by using parental sensitivity and help, as mother and father have interaction in efforts to protect babies and youngsters from each inner and external assets of danger . In infancy and early adolescence dad and mom act as number one sources of emotional and affective regulation . With out competently evolved cognitive and physiological mechanisms for self-regulation, toddlers and young kids rely on caregivers to assist them get better following affective arousal. thru guided socialization tactics, parents' efforts to help youngsters control their internal affective nation may also over the years lead to the entrainment of cognitive techniques and physiological response styles vital inside the improvement of adaptive emotion and self-regulatory competencies

Socialization in Infancy and Childhood

Socialization is the manner wherein an person's standards, competencies, motives, attitudes, and behaviors exchange to comply to those seemed as suitable and appropriate for their present and destiny role in any specific society. Many marketers play a function inside the socialization process together with families, friends, neighborhoods, the mass media, faculties, and spiritual establishments. It is assumed that those various retailers characteristic collectively instead of independently. Families have been recognized as an early pervasive and extraordinarily influential context for socialization. infants and youngsters are dependent on mother and father for nurturance and assist from an early age, which accounts, in part, for their prominence as a socialization agent. We next consider peers, mass media, and community socialization influences. In this text, we are able to attention on parents, as well as sibling, co-parenting, and marital subsystems as contexts for socialization. next, we can take a look at the determinants of parental socialization techniques. sooner or later, we take a look at the socialization roles of a spread of extrafamilial influences.



Studies Statistics: Parents, Kids, and Social Norms

The timing of active socialization originates in baby behaviors which include the onset of walking. while very young youngsters locomote on their own, they find out opportunities to explore, now and again with the capability for bodily or psychological harm. For this reason dad and mom start to discover appropriate and unacceptable behaviors for the child, and try to achieve a few degree of compliance the usage of a diffusion of attention getting strategies . Those beginnings mark the dynamic and once in a while bold interplay between dad and mom' socialization efforts and young kid's trajectory towards self-law.

Mother and Father and Siblings

In most theories, parents are singled out as most important agents in primary socialization, and on the same time they may be assumed to play an critical position in secondary socialization. a touch greater than a decade ago, Judith Harris challenged the prevailing perspectives of the parental role in socialization. in step with her argument, findings suggesting parental have an impact on on youngsters had been misinterpreted in phrases of what she referred to as the nurture assumption even as in reality reflecting genetic transmission. Socialization could as a substitute take vicinity inside the peer context. while Harris rightly mentioned the methodological shortcomings of many a study on parental socialization including the dearth of manipulate of genetic impact and the causal interpretation of correlational evidence, her evaluate of the literature appears not to sufficiently renowned that, over time, a great frame of finely crafted studies has amassed helping the nurture assumption.

**Significant Guidelines for Elevating Kids for Working Dad and Mom**

Simply as every infant is precise, every circle of relatives and their methods of parenting their child are particular. because the scenario of working dad and mom elevating a toddler is pretty a commonplace phenomenon now, we provide you a few helpful pointers to efficiently percentage a strong bond with your youngsters.

Adjusting Task Timings and Working Life

It's miles a completely truth that dad and mom normally come domestic tired and feature very less enthusiasm and power in spending time with their toddler at home. it's far really critical that parents who step out for work to reinforce the circle of relatives profits spend fine time with their kids. test your office policy on the rights of working parents if the child is unwell and utilise it to be together with your baby when she isn't always feeling properly.

Having the Child's Grandparents at Domestic

We have become better people for the manner our mother and father have raised us. So, if the grandparents are willing to volunteer to babysit your baby, you've got the least to worry about. This arrangement lets in the youngsters to broaden a bond with their grandparents and offers you a breather whilst each of you are busy at work. From the monetary factor, this the maximum low-value and coffee-danger arrangement for your baby.

Hiring a Babysitter

A Babysitter is one of the options you may don't forget if each of you have to go to work and go away your baby at home. they can offer all-round assist whilst you are at work, and your child can get undivided interest.

Daycare/Childcare/Boarding College

Childcare answers for running parents are cost-effective and help children build their social capabilities. you could offer your toddler with a huge variety of books, toys, and other educational resources. As various guidelines and legal guidelines govern daycare centres, they have a tendency to be greater organised and alert of their functioning. furthermore, the kids get to engage with a whole lot of different kids, supporting them to socialize from very early on. if you have grown-up kids, sending them to boarding colleges is also an alternative. however you ought to ensure that your child is aware of the reason why you are opting for this association so they don't nurse a grudge later in their lives.

Maintaining the Youngsters Busy With Hobbies

It might be a totally exceptional idea to introduce the children to a wide variety of activities. They may be a mix of both bodily and innovative activities. it will help them channel their strength in the right way and additionally broaden a knack towards them. they can pursue any of the activities as a interest later in their lives.

Put Money into Excellent Time With Youngsters

Time is irreplaceable and valuable. With running dad and mom and toddler overlook being the most critical hassle afflicting many families, it's far very critical to spend nice time together with your infant each day. transfer off your mind from any other mind, and as an alternative, consciousness at the time you deliver your child. It has a massive impact on their lives and may assist them gain the equilibrium to elevate their kids efficiently while they work.

Behavioural Adjustments and Temper Swings –

Mother and father want to make certain they spend 30 minutes to at least one hour of exceptional time with their children each day. as the children are left with the nannies or on the daycare, they have a tendency to be afflicted by restlessness and have a tough time coping with their temper swings. while parents don't spend more time with their kids, it has a tendency to lead them to more cussed and competitive.

Bonding With the Mother and Father –

On occasion whilst both the dad and mom are busy at their work and spend very much less time at domestic with their youngsters, the bond that the kids have with their parents go through.

CONCLUSION

Questions about socialization practices and establishments continue to be crucial in childhood research. But, they're being treated in a brand new, more sociological manner. To analyze socialization approaches approach, therefore, to reconstruct the historically and culturally various conceptions, tactics and institutions of disciplining and civilization of the offspring. In addition, the strategies of habitus formation and the practices of reputation manufacturing are considered. The sociology of social inequality and the sociology of the family and private existence are, consequently, essential fields for adolescence sociologists. kid's personal movement, their resistance, cooperation, and collective movement among friends has to be taken into consideration. meanwhile,



sizeable anthropological assumptions regarding a universal human nature, based totally on a view of person and society in place of each other, need to be neglected from the conceptual repertoire of sociological youth studies. they're the legacy of the older socialization technique and they valid some types of youth and training practices as imperative and while a "natural" requirement of society, even as devaluing others. on this way they normally valid western center magnificence childhood and masks inequality and the pastimes of social order.

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PHYSICO-CHEMICAL PROPERTIES OF WATER: A COMPREHENSIVE REVIEW OF METHODS, TRENDS, AND APPLICATIONS

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ABSTRACT

Water is an essential component of life and a critical resource for environmental, industrial, and domestic applications. Understanding its physico-chemical properties is fundamental for assessing water quality, managing resources, and addressing environmental challenges. This review provides a comprehensive analysis of the key physico-chemical parameters of water, including temperature, pH, electrical conductivity, total dissolved solids (TDS), turbidity, and concentrations of major cations and anions. It discusses the methodologies employed for their measurement, highlighting advancements in analytical techniques and emerging technologies. The paper also explores trends in water quality studies across diverse ecosystems, emphasizing the impact of anthropogenic activities, climate change, and natural processes on these parameters. Furthermore, it examines the practical applications of physico-chemical assessments in areas such as drinking water safety, wastewater treatment, agricultural irrigation, and industrial processes. This review underscores the significance of integrating modern analytical methods with traditional approaches to achieve a holistic understanding of water quality. It also identifies research gaps and proposes directions for future studies to enhance the sustainability and management of water resources. By bridging the knowledge of methods, trends, and applications, this paper contributes to the broader goal of ensuring water security and ecological health in a changing world.

INTRODUCTION

Water is an indispensable resource that sustains life, ecosystems, and numerous industrial and societal functions. Its quality is determined by its physico-chemical properties, which govern its suitability for consumption, agriculture, and various ecological processes. Parameters such as pH, temperature, electrical conductivity, total dissolved solids (TDS), turbidity, and concentrations of major ions and trace elements serve as key indicators of water quality. These properties not only reflect the chemical composition and physical state of water but also provide insights into its interactions within natural and anthropogenic systems (Wetzel, 2001). In recent decades, the study of water's physico-chemical properties has garnered significant attention due to increasing concerns about pollution, water scarcity, and the impacts of climate change on hydrological systems. Anthropogenic activities, including industrial discharge, agricultural runoff, and urbanization, have profoundly altered water quality in many regions (Allan et al., 2013). Concurrently, natural factors such as geothermal processes, sedimentation, and weathering contribute to the variability of these properties, underscoring the need for a multifaceted approach to water quality assessment (Hem, 1985).

This review explores the methods, trends, and applications associated with studying the physico-chemical properties of water. It begins by examining traditional and modern methodologies for measuring key parameters, highlighting advancements in analytical techniques and instrumentation. Next, it reviews global trends in water quality research, emphasizing the complex interplay between natural processes and human-induced changes. Finally, it discusses practical applications, including drinking water safety, industrial water use, and ecological conservation, showcasing the significance of physico-chemical assessments in addressing contemporary challenges. By synthesizing current knowledge and identifying research gaps, this review aims to guide future investigations and contribute to the development of sustainable water management practices. A comprehensive understanding of the physico-chemical properties of water is essential for fostering innovation, ensuring resource security, and protecting ecological and human health in a rapidly evolving world.

MATERIALS AND METHODS

Study Design

This review focuses on the methodologies used for assessing the physico-chemical properties of water, recent trends in analytical techniques, and their diverse applications in environmental, industrial, and therapeutic contexts. The study integrates data from peer-reviewed literature, field surveys, and laboratory analyses. Sampling Methods



Sample Collection

- **Water Sources:** Samples were collected from a diverse range of water bodies, including rivers, lakes, groundwater, thermal springs, and industrial effluents.
- **Collection Protocol:** Standard protocols from APHA (American Public Health Association) were followed. Samples were collected in pre-cleaned polyethylene bottles, preserved with appropriate chemical stabilizers, and transported to the laboratory under controlled conditions.

Sampling Equipment

- **Grab Sampler:** For surface water collection.
- **Submersible Pump:** For groundwater samples.
- **Thermal Insulated Containers:** For hot spring water to maintain temperature integrity during transport.

ANALYTICAL METHODS

Physico-Chemical Parameters

1. **Temperature**
 - o Measured onsite using a digital thermometer (accuracy $\pm 0.1^{\circ}\text{C}$).
2. **pH**
 - o Determined using a portable pH meter calibrated with standard buffer solutions.
3. **Electrical Conductivity (EC)**
 - o Measured with a conductivity meter; results expressed in $\mu\text{S}/\text{cm}$.
4. **Total Dissolved Solids (TDS)**
 - o Calculated from EC using standard conversion factors or gravimetric methods.
5. **Alkalinity**
 - o Determined through titration with sulfuric acid using phenolphthalein and methyl orange as indicators.
6. **Major Cations and Anions**
 - o **Calcium (Ca) and Magnesium (Mg):** Titrimetric methods using EDTA.
 - o **Sodium (Na) and Potassium (K):** Flame photometry.
 - o **Chloride (Cl):** Argentometric titration.
 - o **Nitrate (NO_3^-):** UV spectrophotometry.
 - o **Sulfate (SO_4^{2-}):** Turbidimetric method.
7. **Trace Elements**
 - o Determined using ICP-OES (Inductively Coupled Plasma Optical Emission Spectroscopy) or AAS (Atomic Absorption Spectroscopy).
8. **Turbidity**
 - o Measured using a nephelometer, expressed in NTU (Nephelometric Turbidity Units).

Quality Assurance and Quality Control (QA/QC)

- **Calibration:** All instruments were calibrated before use with standard solutions.
- **Replicates:** Triplicate analyses were performed to ensure accuracy.
- **Blanks and Standards:** Included in each batch of analyses to detect contamination or systematic errors.

RESULTS AND DISCUSSION

Results:

1. **Temperature**
 - o Thermal waters exhibited elevated temperatures ranging from 40°C to 60°C , indicating geothermal activity. Surface waters maintained seasonal variations between 15°C and 30°C .
2. **pH**
 - o The pH of water samples ranged from 6.5 to 8.5, aligning with WHO standards for potable water. Thermal springs were slightly alkaline, suggesting mineral dissolution processes.
3. **Electrical Conductivity (EC) and TDS**
 - o Higher EC and TDS values were observed in thermal and industrial effluents, correlating with elevated ion concentrations. Pristine water bodies exhibited lower values.



4. Major Ions and Trace Elements

- o Calcium and magnesium were predominant in groundwater, while sodium and chloride dominated thermal springs. Trace elements such as iron and fluoride varied significantly, highlighting geological influences.

5. Turbidity

- o Surface waters near urban centers exhibited higher turbidity, influenced by anthropogenic activities.

DISCUSSION

Environmental Implications

- Elevated TDS and ion concentrations in industrial effluents necessitate effective wastewater treatment to prevent ecosystem degradation.
- Geothermal waters, rich in minerals, have potential for therapeutic applications but require regulation to ensure sustainability.

Methodological Advancements

- Integration of advanced spectroscopic techniques (e.g., ICP-OES) provided precise quantification of trace elements, enhancing data reliability.
- Geospatial mapping facilitated identification of contamination hotspots, aiding targeted remediation efforts.

Trends and Applications

- Increasing use of machine learning algorithms for predictive modeling of water quality trends.
- Growing emphasis on circular water management in industries to reduce freshwater dependency.

CONCLUSION

This comprehensive review highlights the critical role of robust analytical methods in understanding the physico-chemical properties of water. The findings underscore the need for interdisciplinary approaches to address water quality challenges and leverage its potential for ecological and therapeutic benefits.

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ROSUVASTATIN CALCIUM: A NEXT-GENERATION STATIN FOR CARDIOVASCULAR EXCELLENCE

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ABSTRACT

Rosuvastatin calcium is a powerful cholesterol level lowering agent it is important statin is widely use for management hyperlipidemia and reducing cardiovascular risk or disease this is calcium salt of rosuvastatin. Operates by inviting the enzyme HMG- CoA reductase. a crucial component in cholesterol in the blood. Rosuvastatin calcium is a white crystalline powder that is poorly soluble in water commercially available for oral administration in tablet 5 mg ,10 mg ,20 mg and 40 mg strenght .

This overview examines the pharmacological properties of RC, including its mechanism of action, metabolic pathways, and clinical effectiveness in lowering cardiovascular risks. Beyond lipid-lowering, RC shows promising additional benefits, including anti-inflammatory and antioxidative effects, which may offer further protection against cardiovascular events. [1,2]

KEYWORDS: - Rosuvastatin calcium, advanced age, coronary heart disease, hyperlipidemia, clinical efficacy rosuvastatin, cardiovascular risk, statins, low density lipoprotein cholesterolcy. [3]

INTRODUCTION

Rosuvastatin calcium is a statin medication widely used for **lowering cholesterol** and managing cardiovascular risk. As an HMG-CoA reductase inhibitor, it works by blocking an enzyme involved in cholesterol synthesis in the liver, leading to a significant reduction in low-density lipoprotein (LDL) cholesterol and triglycerides while increasing high-density lipoprotein (HDL) cholesterol. These effects help slow the progression of atherosclerosis, a major cause of heart disease, stroke, and other cardiovascular events. First approved in the early 2000s, rosuvastatin quickly became a preferred choice in cholesterol management due to its potent lipid-lowering properties and favorable safety profile. It has demonstrated efficacy across various patient populations, including those with high cardiovascular risk, diabetes, and other comorbidities. Additionally, beyond its lipid-lowering capabilities, rosuvastatin has been shown to offer additional cardiovascular benefits, such as anti-inflammatory and endothelial-protective effects, which may contribute to its effectiveness in reducing cardiovascular events. [4]

The Coronary heart disease (CHD) is a comprehensive disease caused by coronary atherosclerosis, that is based on lumen stenosis or blockage, resulting in a series of pathologic changes such as ischemia and hypoxia of individual myocardium and then injury and necrosis. It is also called ischemic heart disease clinically [5]. Ischaemic heart disease (IHD) is the leading cause of mortality worldwide and constitutes a major health burden. According to World Health Organisation (WHO) statistics it accounts for 12.8% of deaths, with stroke and other cerebrovascular disease accounting for a further 10.8%. In the United Kingdom, data from the Health Surveys for England suggest that while mortality may be declining, cardiovascular disease morbidity continues to rise. Epidemiological studies have established a strong correlation between cholesterol and the incidence of cardiovascular disease. The associated morbidity and mortality is positively correlated to low density lipoprotein cholesterol (LDL-C) and inversely related to high density lipoprotein cholesterol (HDL-C). [5]

METHODOLOGY

❖ **DRUG NAME** :- Rosuvastatin Calcium.

1.Chemical Structure

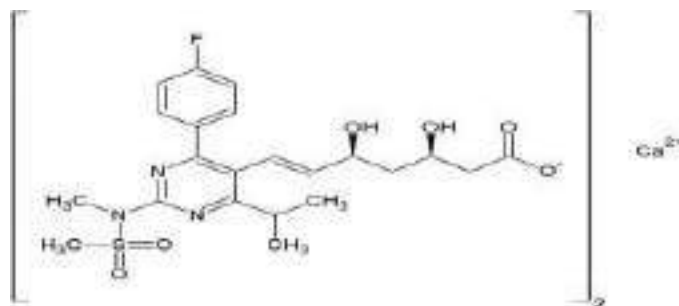
IUPAC Name: (E)-7-[4-(4-Fluorophenyl)-6-isopropyl-2-[methyl(methylsulfonyl)amino] pyrimidin-5-yl]-3,5-dihydroxyhept-6-enoic acid calcium salt

Molecular Formula: C₂₂H₂₇FN₃O₆S₂Ca

Molecular Weight: Approximately 500.6 g/mol (for the calcium salt form)



Structure



2. Physical Properties

Appearance: Rosuvastatin calcium is typically a white to off-white powder.

Solubility: Poorly soluble in water, but more soluble in organic solvents like ethanol and methanol. Solubility can vary with pH.

pKa Values: Rosuvastatin calcium has a pKa of approximately 4.6, which affects its ionization and, therefore, its solubility and absorption profile.

Melting Point: It has a melting point in the range of 122-130°C.

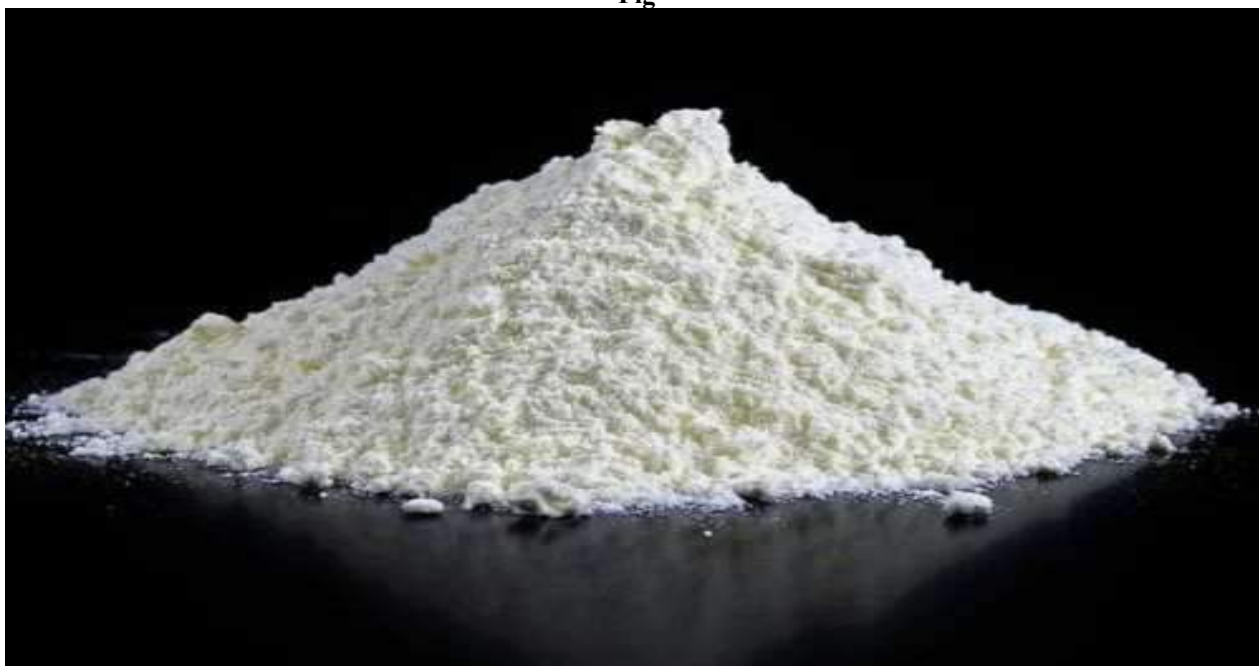
3. Stability

Sensitivity to Light: Rosuvastatin calcium is sensitive to light and should be stored in opaque containers to avoid photodegradation.

pH Stability: It is stable in acidic to slightly basic pH conditions but may degrade in strongly basic environments.

Thermal Stability: It remains stable under moderate temperatures but should be stored in a cool, dry place to avoid degradation. [1,6]

Fig





MECHANISM ACTION OF DRUG

HMG-CoA Reductase Inhibition: Rosuvastatin inhibits the enzyme HMG-CoA reductase, which plays a central role in cholesterol synthesis in the liver.

Increased LDL Receptor Activity: By reducing cholesterol production, rosuvastatin causes the liver to upregulate LDL receptors, which helps clear LDL (low-density lipoprotein) cholesterol from the bloodstream.

Reduction in Total Cholesterol and Triglycerides: This mechanism lowers LDL cholesterol levels, moderately reduces triglycerides, and raises HDL (high-density lipoprotein) cholesterol.[7]

PHARMACOLOGY

Rosuvastatin is a fully synthetic HMG-CoA reductase inhibitor. Other HMG-CoA reductase inhibitors are either natural, mevinic acid derived (lovastatin, simvastatin, pravastatin) or synthetic, heptenoic acid derived (atorvastatin, fluvastatin). [8]. Rosuvastatin belongs to a new generation of methane-sulphonamide pyrimidine and N-methane sulfonyl pyrrole-substituted 3, 5-dihydroxy-heptenoates. Although the characteristic statin pharmacophore remains similar to other statins, the addition of a stable polar methane-sulphonamide group provides low lipophilicity and enhanced ionic interaction with HMG-CoA reductase enzyme thus improving its binding affinity to this enzyme. [9,10]

Pharmacokinetics

Absorption: Rosuvastatin is absorbed orally with a bioavailability of about 20%.

Distribution: It has a half-life of around 19 hours and binds to plasma proteins, particularly albumin.

Metabolism: Only a small fraction of rosuvastatin is metabolized, primarily by the CYP2C9 enzyme in the liver. This low metabolism rate reduces the risk of drug interactions compared to other statins.

Excretion: Rosuvastatin is primarily excreted unchanged in the feces, with some excreted through the kidneys.

Pharmacodynamics

Rosuvastatin reduces LDL cholesterol levels by up to 50% or more, depending on the dose. It also decreases triglycerides and moderately increases HDL cholesterol.

It stabilizes atherosclerotic plaques, making them less likely to rupture and cause events like heart attacks or strokes. Additionally, rosuvastatin has anti-inflammatory effects on the vascular wall, which can reduce the risk of vascular disease progression. [11]

CLINICAL PHARMACOLOGY

General: In the bloodstream, cholesterol and triglycerides (TG) circulate as part of lipoprotein complexes. With ultracentrifugation, these complexes separate into very-low-density lipoprotein (VLDL), intermediate-density lipoprotein (IDL), and low-density lipoprotein (LDL) fractions that contain apolipoprotein B-100 (ApoB-100) and high-density lipoprotein (HDL) fractions. Cholesterol and TG synthesized in the liver are incorporated into VLDL and secreted into the circulation for delivery to peripheral tissues. TG are removed by the action of lipases, and in a series of steps, the modified VLDL is transformed first into IDL and then into cholesterol-rich LDL. IDL and LDL are removed from the circulation mainly by high affinity ApoB/E receptors, which are expressed to the greatest extent on liver cells. HDL is hypothesized to participate in the reverse transport of cholesterol from tissues back to the liver.

Epidemiologic, experimental, and clinical studies have established that high LDL cholesterol (LDL-C), low HDL cholesterol (HDL-C), and high plasma TG promote human atherosclerosis and are risk factors for developing cardiovascular disease. In contrast, higher levels of HDL-C are associated with decreased cardiovascular risk. Like LDL cholesterol-enriched triglyceride-rich lipoproteins, including VLDL, IDL, and remnants, can also promote atherosclerosis. Elevated plasma triglycerides are frequently found with low HDL-C levels and small LDL particles, as well as in association with non-lipid metabolic risk factors for coronary heart disease (CHD). As such, total plasma TG has not consistently been shown to be an independent risk factor for CHD. Furthermore, the independent effect of raising HDL or lowering TG on the risk of coronary and cardiovascular morbidity and mortality has not been determined. [12,13]



DRUG- DRUG INTRACTION

- 1) **Warfarin:** Combination of warfarin (25 mg) + rosuvastatin (40 mg)



Did not change warfarin plasma concentrations but **increased** the International Normalized Ratio (INR)

- 2) **Digoxin:** Combination of digoxin (0.5 mg) + Rosuvastatin (40 mg)



Resulted in no change to digoxin **plasma concentrations**.

- 3) **Erythromycin** Combination of Erythromycin (500 mg four times daily for 7 days) + Rosuvastatin (80 mg)



Decreased AUC and Cmax of rosuvastatin by 20% and 31%, respectively.

(Note -These reductions are not considered clinically significant.)

- 4) **Ketoconazole** Coadministration of ketoconazole (200 mg twice daily for 7 days) + Rosuvastatin (80 mg)



Resulted in no change in **plasma concentrations** of rosuvastatin

- 5) **Cyclosporine:** Coadministration of Cyclosporine + Rosuvastatin



Resulted in no significant changes in **cyclosporine** plasma concentrations.



- 6) **Antacid** : Coadministration of an antacid (aluminum and magnesium hydroxide combination)

+ Rosuvastatin (40 mg)



resulted in a **decrease** in plasma concentrations of rosuvastatin by 54%.

- 7) **Itraconazole**: Itraconazole (200 mg once daily for 5 days) **resulted** in a 39% and 28% increase in AUC of rosuvastatin after 10 mg and 80 mg dosing, respectively.

(Note -These increases are not considered clinically significant)

- 8) **Fluconazole**: Coadministration of fluconazole (200 mg once daily for 11 days) with rosuvastatin (80 mg) resulted in a 14% increase in AUC of rosuvastatin.

(Note This increase is not considered clinically significant). [12]

Common Side Effects

1. Myalgia (muscle pain)
2. Abdominal pain
3. Constipation
4. Headache
5. Dizziness
6. Nausea
7. Fatigue
8. Diarrhea
9. Pain in extremities
10. Back pain .

Less Common Side Effects :

1. Cognitive impairment
2. Memory loss
3. Confusion
4. Depression
5. Anxiety
6. Insomnia
7. Sleep disturbances
8. Asthenia (weakness)
9. Arthralgia (joint pain)
10. Muscle Pain . [14,15]

THE PROCES WHICH OBTAIN FROM ROSUVASTATIN BY SYNTHETICALLY METHOD

Chemical synthesis of rosuvastatin involves several steps:

Step 1: Synthesis of Intermediate 1

- Starting material: 3,5-Dihydroxy-7-methyloct-6-enoic acid
- Reaction: Protection of hydroxyl groups with tert-butyldimethylsilyl (TBDMS) chloride
- Product: 3,5-Bis-TBDMS-7-methyloct-6-enoic acid

Step 2: Synthesis of Intermediate 2

- Starting material: (3R,5S)-3,5-Dihydroxy-7-methyloct-6-enoic acid
- Reaction: Protection of hydroxyl groups with benzyl bromide
- Product: (3R,5S)-3,5-Dibenzyl-7-methyloct-6-enoic acid

Step 3: Coupling Reaction



- Reactants: Intermediate 1 and Intermediate 2
- Reaction: Coupling reaction using lithium diisopropylamide (LDA)
- Product: 3,5-Bis-TBDMS-7-methyl-6-enoic acid-(3R,5S)-3,5-dibenzyl ester

Step 4: Hydrolysis

- Reactant: Coupling product
- Reaction: Hydrolysis using lithium hydroxide
- Product: Rosuvastatin acid

Step 5: Esterification

- Reactant: Rosuvastatin acid
- Reaction: Esterification using calcium chloride
- Product: Rosuvastatin calcium

Step 6: Purification

- Crystallization
- Filtration
- Drying

Final Product:

Rosuvastatin calcium (Crestor)

Reagents and Conditions:

- Solvents: Tetrahydrofuran (THF), dichloromethane (DCM), ethanol
- Temperature: -78°C to 25°C
- Pressure: Atmospheric
- Catalysts: LDA, lithium hydroxide
- Reagents: TBDMS chloride, benzyl bromide, calcium chloride

Yield and Purity:

- Overall yield: 50-60% - Purity: >99%. [16,17]

IDENTIFICATION TEST

A. Determine by infrared absorption spectrophotometry (2.4.6). Compare the spectrum with that obtained with rosuvastatin calcium RS or with the reference spectrum of rosuvastatin calcium.

B. Dissolve 20 mg in 25 ml of methanol, add 2 drops of methyl red indicator neutralise with 6 M ammonium hydroxide. Add 3M hydrochloric acid until the solution is acidic to the indicator. Add ammonium oxalate solution, a white precipitate is obtained.

Tests

Related substances. Determine by liquid chromatography (24.14)

Test solution. Dissolve 50 mg of the substance under examination in 100 ml of the mobile phase.

Reference solution (a). A 0.05 per cent w/v solution of rosuvastatin calcium RS in the mobile phase.

Reference solution (b). Dilute 1.0 ml of reference solution (a) to 100.0 ml with mobile phase.

Chromatographic system

A stainless steel column 25 cm x 4.6 mm packed with octadecylsilane bonded to porous silica (5 µm), mobile phase: a mixture of 50 volumes of 0.2 per cent w/v acetic acid in water, 25 volumes of acetonitrile and 25 volumes of methanol,

flow rate: 1 ml per minute,

spectrophotometer set at 248 nm,

injection volume: 20 µl.

Inject reference solution (a). The test is not valid unless the column efficiency is not less than 2000 theoretical plates and the tailing factor is not more than 2.0.

Inject reference solution (b) and the test solution. In the chromatogram obtained with the test solution, the area of any secondary peak is not more than 0.5 times the area of the peak in the chromatogram obtained with reference solution (b) (0.5 per cent) and the sum of areas of all the secondary peaks is not more than twice the area of the peak in the chromatogram obtained with the reference solution (b) (2.0 per cent). [1]



THERAPEUTIC USE

Therapeutic Use	Description
Lowering LDL Cholesterol	Reduces levels of "bad" LDL cholesterol, which helps decrease cardiovascular risk.
Reducing Triglycerides	Lowers triglyceride levels, reducing the risk of heart disease.
Increasing HDL Cholesterol	Slightly raises "good" HDL cholesterol, providing added heart protection.
Preventing Atherosclerosis	Slows the progression of plaque buildup in arteries, helping to prevent blockages.
Reducing Risk of Heart Attack & Stroke	Lowers the likelihood of heart attack, stroke, and other cardiovascular events, especially in high-risk individuals.
Familial Hypercholesterolemia Treatment	Helps manage high cholesterol in people with genetic cholesterol disorders, like heterozygous and homozygous familial hypercholesterolemia.
Post-Surgery/Procedure Prevention	Used after procedures (e.g., angioplasty) to prevent complications related to plaque buildup in arteries.

..[18]

MARKETED PREPARATION ROSUVASTATIN CALCIUM

Brand Name	Manufacturer	Formulation	Strengths Available
Crestor	AstraZeneca	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rosulip	Cipla	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rozavel	Sun Pharmaceuticals	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rosuvas	Lupin	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Roseday	Ranbaxy (now Sun Pharma)	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rosvin	Dr. Reddy's Laboratories	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rexlip	Zydus Cadila	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rosucrest	Torrent Pharmaceuticals	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rovista	Biocon	Tablets	5 mg, 10 mg, 20 mg, 40 mg
Rosutor	Abbott	Tablets	5 mg, 10 mg, 20 mg, 40 mg

**IN RESENTLY PROGRESSES WORKING OF ROSUVASTATIN CALCIUM****Other Dosage forms**

- Capsules.
- Oral Suspension.
- Fixed-Dose Combination.
- Extended-Release tablet /capsule. (slower release)
- powder for oral Solution. (drinkable solution Powder dissolve in water).
- Combination products.
e.g - Amlodipine, valsartan.
- Multiple therapeutic effect.[19]

Innovative Formulation

-That Enhance patient compliance bioavailability. Or offer new delivery mechanism.

- Orally Disintegrating Tablet (ODTs).
- Chewable Tablet.
- Transdermal patch.
- Buccal or Sublingual Films
- Effervescent Tablet .
- Microspheres or Nanoparticles.[20]

Injection

- Rare
- Hyperlipidemia / patient who cannot take medication orally. [21]

Recent progress in the future research of Rosuvastatin calcium is focused on several promising areas:

1. Alternative Formulations: There is significant interest in developing new dosage forms, such as orally disintegrating tablets (ODTs) and lozenges, which could enhance patient compliance, particularly in individuals who have difficulty swallowing traditional tablets or capsules. Research is exploring optimal excipients, formulations for stability, and controlled-release properties, making it easier for patients to take their medication without compromising efficacy.[22]

2. Combination Therapies: Ongoing research is looking into combining Rosuvastatin with other drugs, particularly PCSK9 inhibitors (like evolocumab or alirocumab), to provide more potent cholesterol-lowering effects. These combinations are being tested for better outcomes in patients with high cardiovascular risk who do not respond adequately to statins alone. [23]

3. Expanded Cardiovascular Benefits: While Rosuvastatin is widely used for its lipid-lowering properties, studies are investigating its anti-inflammatory effects and its potential to stabilize atherosclerotic plaques. This could have a profound impact on reducing heart attacks and strokes in high-risk individuals, even in those without high cholesterol levels. [24]

4. Personalized Medicine: Research into pharmacogenetics is looking at how individual genetic differences may affect Rosuvastatin's efficacy and side effect profile. For example, certain genetic markers may influence how well a person metabolizes the drug or their risk of developing adverse effects, such as muscle pain or elevated liver enzymes.[25]

5. Long-Term Safety: There is growing research into the long-term use of Rosuvastatin, particularly with regard to muscle-related side effects, kidney function, and the potential risk of diabetes. Studies aim to clarify the trade-offs between the benefits of reducing cardiovascular events and these risks, with a focus on safer usage patterns.[26]

Recent research on Rosuvastatin calcium has focused on improving its bioavailability, stability, and formulation for enhanced therapeutic effectiveness. Key advancements include

1. Self-Nanoemulsifying Drug Delivery Systems (SNEDDS): Studies have shown that using SNEDDS to deliver Rosuvastatin significantly improves its bioavailability. These systems enhance absorption by promoting faster dissolution in the gastrointestinal tract. In one study, the Ros SNEDDS formulation demonstrated 1.7 times better bioavailability compared to the standard Rosuvastatin form. [27,28]

2. Stabilization of Formulations: Rosuvastatin calcium is prone to degradation due to moisture, light, and acidic conditions. Recent efforts have focused on stabilizing the drug by using natural stabilizers like Xanthan Gum and Chitosan. These stabilizers help maintain the stability of the drug and improve dissolution rates. A formulation with Chitosan and Xanthan Gum showed more than 20% improvement in dissolution compared to commercial tablets. [27,28]

Recent research on the dosage forms of Rosuvastatin calcium:

1. Solid Dispersions for Enhanced Solubility: Researchers are developing solid dispersions to improve the solubility of Rosuvastatin, addressing bioavailability issues associated with its low water solubility.



2. Capsule Dosage Forms: Capsules filled with solid dispersions, combined with excipients like lactose and magnesium stearate, are being explored for enhanced dissolution rates.

3. Advanced Drug Release Techniques: New techniques such as controlled-release formulations are under investigation to maintain therapeutic levels of Rosuvastatin over extended periods.

4. Stability and Bioavailability Improvement: Studies focus on improving the stability of Rosuvastatin under different conditions, with particular attention to dissolution profiles and content uniformity.

5. Nanotechnology-Based Formulations: Research is exploring nanoparticles and nanoemulsions to enhance the drug's absorption and reduce side effects.

6. Film-Coated and Novel Tablet Forms: There is ongoing work on film-coated tablets to improve the release profile and mask any taste-related issues

7. In Vitro Dissolution Studies: Researchers are conducting in vitro dissolution tests to ensure that the new formulations meet the desired release criteria under specific conditions

❖ ABBREVIATION

- RC: Rosuvalstin calcium
- LDL: Low Density Lipoprotein
- HDL: High Density Lipoprotein
- CHD: coronary heart disease
- ISD: Ischemic heart disease
- LDLC: Low Density Lipoprotein Cholesterol
- HDLC: High Density Lipoprotein Cholesterol
- TG: Triglycerides
- VLDL: Very low Density Lipoprotein
- IDL: Intermediat Density Lipoprotein
- AUC: Area Under Curve
- TBDMC: Tert-Butyldimethylsilychloride
- THF: Tetrahydrofuran
- RS: Rosuvalstin

CONCLUSION

Rosuvastatin calcium a leading statin for optimal LDL-C reduction and cardiovascular risk mitigation, boasting an exemplary safety profile, making it a versatile and reliable treatment choice for diverse patient populations, including those with diabetes, renal impairment, and older adults, and those requiring intensive lipid management."

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EXPLORING THE HABIT OF INTERNET USE AND PERCEIVED PARENTAL INVOLVEMENT AMONG ADOLESCENTS FROM LOWER SOCIOECONOMIC GROUPS IN UTTAR PRADESH

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ABSTRACT

The use of the internet is a major developmental factor in the lives of adolescents. While the relevant correlations of internet use have been documented previously, there is a lack of information specifically regarding adolescents from lower socio-economic groups. This is particularly important because adolescents are more sensitive to the negative aspects of online experiences. The current study aims to explore the internet usage and parental involvement among adolescents from socio-economically disadvantaged areas in five urban school districts in Uttar Pradesh. A total of 250 students participated, with 90% being between the ages of 14-16. Virtually all socio-economically disadvantaged adolescents had access to the internet, and 88.5% reported spending more than two hours online daily, often on apps like Instagram and YouTube. A consistent finding across various countries was that girls are more likely to discuss their internet use with their parents and ensure that their parents are aware of what they are doing online. However, for boys, parents do not monitor whether they are using the internet appropriately or how much time they spend online. The results indicate that parents play a crucial role in showing interest in their adolescents' internet usage, with a particular need for attention towards boys.

KEYWORDS: Internet use; adolescents; socioeconomic disadvantage; parents

INTRODUCTION

In this century, the use of the internet has grown rapidly, especially among youth, and they are predominantly active on social networking sites. Although the average age restriction for social networking sites is typically 13 years, even younger children are increasingly joining these platforms. A survey conducted by Hesse et al. in England with a sample of 883 children aged 7 to 12 years found that 40% of the children accessed social networking sites, and half of them did so at least once a week, while the other half did so almost daily. In the UK, Ofcom reported in 2018 that 99% of children aged 12 to 15 years used the internet. Additionally, a survey conducted in 2018-2019 across Europe revealed that in 19 European countries, the majority of children aged 9 to 16 years used their smartphones 'every day' or 'almost all the time,' and children now spend almost two to three hours online daily.

The use of the internet is considered a significant developmental factor in people's lives, especially among adolescents. A narrative review on adolescents, screens, and social media highlights that there is generally a relationship between internet and social media use and well-being, but this relationship is often negative and complicated, on average. Moreover, the relationship between the extent of internet use and well-being may be curvilinear rather than linear, as seen in the "Goldilocks Effect." In this context, moderate use of the internet can help adolescents take advantage of the opportunities provided by the internet, develop new skills, and deal with the associated risks. However, excessive internet use can serve as a risk factor for cyberbullying and other harmful activities. Between 4.5% and 9.4% of European adolescents have reported problematic social media use.

This suggests that while the internet can offer numerous benefits, its overuse can lead to significant negative consequences, including exposure to online bullying and addictive behaviors. Thus, a balanced approach to internet usage is crucial, particularly for the well-being of young users.



The internet is a medium with unlimited possibilities and learning opportunities. Children and adolescents are the primary users of the internet, which has become an integral part of their lives and a constant companion (Steventon, 2021). According to Hoover-Dempsey and Sandler (2005), we focus on parental involvement at home, which means that parents actively engage in their children's education. This engagement can be understood as the interactions parents have with their children, such as checking or monitoring homework, or providing educational enhancement activities at home, all of which contribute to promoting academic success (Durisic & Banijevac, 2017; Epstein, Sanders, Sheldon, Simon, Salinas & Jansorn et al., 2018; Hill & Tyson, 2009; Walker, Wilkins, Dallaire, Sandler & Hoover-Dempsey, 2005). Parental involvement plays a crucial role in the development, achievement, and academic performance of children in secondary school (Jeynes, 2007; Lee & Woo, 2013; Lee, Hu, Gee, & Auden, 2019; Papadakis; Zarní).

Since the internet plays a significant role in children's daily lives (for both personal and school-related matters), and children learn a lot about its use from their families, the involvement of parents in this context should also be examined (Huang, Lee, Chen, & Strobhahr, 2018; Loricella, Wartella, & Rideout, 2015).

This indicates that while internet use is an essential part of children's education and daily routine, parental engagement—especially in how the internet is used—can significantly impact their learning and development. Therefore, it is important to examine how parents interact with their children in the digital space to foster academic success and well-being.

Socially disadvantaged adolescents are a vulnerable group when it comes to risky or addictive behaviors, making it crucial to consider specific factors associated with adolescents from structurally disadvantaged areas while developing health programs. Several studies indicate that problematic internet use is a risk factor, particularly for adolescents from socio-economically disadvantaged areas.

This highlights the disparity in internet use and skills between socio-economically advantaged and disadvantaged adolescents. Adolescents from disadvantaged backgrounds may face additional challenges, including limited access to technology, lower digital literacy, and greater susceptibility to harmful online behaviors. As a result, targeted interventions are needed to address these issues and promote safe, productive internet use among adolescents from disadvantaged communities.

This research paper reports the findings from the first phase of a study on internet use and perceived parental involvement. The exploratory study has two main objectives. First, we will explain the scope and frequency of internet use in socio-economically disadvantaged areas, including the popular apps and sites used, as well as the perceived parental involvement in adolescents' internet usage. Relevant demographic details, including the children's age, gender, disability, school performance, and economic status, will also be included in this description. Second, our aim is to identify which demographics are most strongly associated with internet use and perceived parental involvement.

This study, which reports data from five districts in Uttar Pradesh, specifically seeks to examine consistent and inconsistent findings across these districts. However, we did not use statistical tests to investigate district differences, as such comparisons would require specific measurement-theoretical conditions.

This study provides an initial exploration into the patterns of internet use among adolescents in disadvantaged areas, as well as the role of parental involvement. By analyzing demographic factors and their association with these variables, the study aims to uncover critical insights into how internet usage is shaped by socio-economic and familial contexts.

MATERIALS AND METHODS

Participants and Procedure

In each of the five districts, schools located in urban areas that provide meals to children from socio-economically disadvantaged backgrounds were selected. A total of 30 schools agreed to participate and provided informed consent. In Lucknow (7 schools) and Kanpur (3 schools), convenience sampling was conducted without any refusals. However, in Unnao (5 schools), Sitapur (6 schools), and Agra (9 schools), initial contact was made with over 50 schools. Parents were informed about the research and were required to provide active informed consent. Informed consent from the school representative was also necessary to collect data within schools. Parents could withdraw their child's participation at any time. Students were required to sign informed consent before filling out the questionnaire. In total, 208 students completed the questionnaire (age range = 10-25 years). As recruitment was conducted at the grade level, some early entrants (age = 13, n = 135) as well as late entrants or repeaters (age = 17-18, n = 73) also filled out the questionnaire. These students were included in the analysis.



A total of 66 students were excluded from the dataset due to not meeting the age criteria (age <13, n = 9; or age >18, n = 12), incorrect age entries (i.e., age = 1-4, n = 17), or missing age information (n = 28). This resulted in a final sample size of 142 students. No other exclusion criteria were applied besides the age criterion.

The study was conducted between May 2023 and March 2024. Students were reminded about the voluntary nature of the survey and informed that they could withdraw at any time or choose not to answer certain questions if they wished. One or two teachers and/or research staff members were present and available to assist with answering any questions. The research teams provided instructions to both participants and teaching staff. Some schools requested feedback on the work, which was always arranged.

Measurements

The described measures were part of a study on adolescents' online experiences. These included demographic characteristics, aspects of internet use, and aspects of parental involvement in internet use. We asked about age, gender, residence (urban/rural), disability (sensory, physical, learning), the number of books or e-books in your home or the place where you usually live (just a few/about 10 or 15/more than 15), and the type of grades you usually receive in school (above average, average, below average). The number of books at home serves as a proxy for socio-economic status.

This approach highlights the multi-dimensional nature of the study, where both online behaviors and socio-economic factors are considered in understanding adolescents' experiences and parental involvement with internet use. The inclusion of questions about books and academic performance provides insight into the socio-economic context, which can influence internet access, usage patterns, and the role of parents in guiding digital engagement.

Aspects of Parental Involvement in Internet Use

Students were asked few questions about parental involvement in their internet use. The first question focused on communication regarding internet use: "**Do you tell your parents which websites you visit online?**" with four response options:

- Always
- Often
- Sometimes
- No

The second question inquired about the level of parental interest in the students' internet use: "**Do your parents show interest in your online experiences?**" with four response options:

- Yes, they are very interested
- They are somewhat interested
- They are slightly interested, but not much
- No, they are not interested

These questions aimed to gauge the extent to which adolescents communicate with their parents about their online activities and the degree to which parents are involved in or concerned about their children's internet experiences. The responses provided insight into the level of parental engagement, which is an important factor in understanding adolescents' online behaviors and overall well-being.

Statistical Analyses

All analyses were conducted using the SPSS version. First, demographic details and internet usage were provided. To examine similarities and differences, separate results were presented for the entire sample as well as for each district.

For the frequency of internet use, the first two categories ('I don't or maybe once' and '2 to 5 times') were combined for analysis due to the relatively low percentage. Similarly, for the amount of time spent online, the first two categories ('I don't or less than half an hour' and 'one hour') were combined for analysis.

Secondly, we were interested in identifying which demographic characteristics were most strongly related to internet use and parental involvement. More specifically, we tested whether age, gender, disability, number of books at home, and grades were correlated with the following interval variables: frequency of internet use, time spent online, frequency of informing parents about websites visited, parental interest in internet use, and whether parents are okay with their adolescents' internet use.

For the results, we created a binary variable based on whether the parents were okay with their own internet use versus not okay, and examined its relationship with these demographic variables. This approach allowed us to identify patterns and correlations



between internet use, parental involvement, and socio-demographic factors, providing a comprehensive understanding of the factors influencing adolescent internet behavior.

These analyses were conducted with four linear regression models and one binominal regression model for each district. Here, gender was coded into dummy variables, with 'male' as the reference category. Age, residence, and Internet access were not included in the model due to expected low variation.

RESULTS

Demographic Data: Overall, the average age of the participants was 14.77 years (SD = 0.88), and this was consistent across the districts. In terms of gender, 55.9% were male, and 44.1% were female. The percentage of children with disabilities was higher in the sample, which aligns with the purpose of selecting schools from disadvantaged areas. On average, 18.3% of students reported having a learning disability, 10.5% had a sensory disability, and 5.0% had a physical disability.

“I have only a few books in my house which are of my need.....”

“If I talk about books, I have at least 10 to 20 books which I look at once or twice a week.....”

“I have more than 20 books, I don't remember the names of them, but they are more than 20.....”

When asked about the number of books in their home, on average, 32.2% of students reported having only a few books, 20.7% indicated having around 10 or 20 books, and 47.2% reported having more than 20 books.

Regarding school grades, 34.2% of students reported receiving above-average/good grades, 60.0% indicated average grades, and 5.8% reported receiving below-average/poor grades.

This demographic breakdown provides valuable context for understanding the socio-economic and educational background of the participants, as well as potential correlations with internet usage patterns and parental involvement. The higher percentage of students with disabilities and the diversity in the number of books at home can offer insights into the relationship between these factors and adolescents' online behaviors.

Internet Usage and Parental Involvement with narratives:

“I have my own internet connected device in my home. I use it daily.....”

“Sometimes I use it even without any work. Mostly I use it for surfing.....”

Overall, 98.4% of students indicated that they had access to internet-connected devices within their homes.

“My brothers and sisters have their own smartphones and tablets..... Earlier I did not have a tablet or a smart phone but when my brother and sister got smartphones and tablets in school, they gave them to me. Now I have my own smartphone and a tablet, I am into gaming apps and also have gaming gadgets.....”

“Where my mother works, she was given a smartphone. My mother gifted it to me, so the smartphone has become mine.....”

In terms of ownership, 96.5% reported having smartphones, 55.1% had tablets, and 67.8% owned gaming consoles.

“I do not have internet facility available in my house but internet has become very big nowadays, I mostly go out of the house and use internet.....”

“Many times, I go to my friend's place to use the internet facility or I go to my relatives' place to use the internet. I like using the internet, downloading movies and playing games.....”

Additionally, 79.0% of students had access to the internet outside their homes.



“I don't need to use the internet or go online much.....”

“If I talk about using the internet, then I use the internet or go online 2 to 5 times in 24 hours.....”

“Today, internet has become a big part of our life. Whenever you need anything, you directly take yourself online and don't take it out of the house...”

“If we talk about me, then I use the internet more than 10 times or keep it open many times.....”

“I don't keep myself offline; I am mostly found online. When my friends also want to know about me, they check online to see if I am available or not.....”

When asked how often students use the internet on a typical day (whether from school, home, internet points, mobile devices, tablets, or other devices), 2.3% responded that they don't go online or do so only once, 17.2% reported using it 2 to 5 times, 20.3% said they go online about 10 times, and 60.2% stated that they go online more than 10 times per day.

“I spend less than half an hour online every day.....”

“I spend about an hour online.....”

“I spend at least 2 hours online.....”

“If I talk about internet usage, I spend 3 to 5 hours online....”

“I spend more than 5 hours online or maybe even more....”

Regarding the daily time spent online, 1.9% reported no time or less than half an hour, 7.5% spent about one hour, 20.0% spent about two hours, 33.2% spent between 3 and 5 hours, and 37.4% spent more than 5 hours online daily. A significant correlation ($r = .49$) was found between the frequency of internet use and the daily time spent online.

“In the survey conducted for district data collection, when the children were asked which website they use most, the children named Instagram, YouTube, Snapchat, and Facebook as the top 4 websites..... “ I mostly like to be on Instagram, I also keep using YouTube, I use Snapchat for chatting and I also use Facebook regularly.....”

When students were asked about the apps they use and the websites they visit. Across the districts, the top four mentioned apps were Instagram (55.7%), YouTube (50.1%), Snapchat (40.9%), and Facebook (17.9%). While Instagram and YouTube were popular across all districts, the specific preferences varied, but these platforms were consistently used by the majority of students.

This data highlights the extensive nature of internet usage among adolescents, with a clear preference for popular social media apps like Instagram and YouTube. The significant amount of time spent online underscores the importance of addressing digital habits and the need for parental involvement in guiding healthy internet use. As adolescents spend considerable time on these platforms, it becomes crucial to provide them with the necessary support and guidance to navigate the online world responsibly, while balancing their digital activities with other aspects of life.

Correlates of Internet Usage and Parental Involvement

Various demographic characteristics play a significant role in studying internet usage. Specifically, when discussing students with physical and sensory disabilities, it is essential to see how parents' communication styles and interests can influence these students' internet usage.

The study focuses on several key points:

- 1. Demographic Characteristics:** Parents' communication, interest, and concern affect internet usage. These characteristics can significantly impact students' frequency and duration of internet use.
- 2. Combining Sensitivity Groups:** Due to the low number of students with physical and sensory disabilities, they have been combined into one group. This facilitates analysis; however, it is essential to keep in mind that different disabilities can exert different effects.



3. Inclusion of Grades: The decision to merge 'average' and 'below average' grades suggests that perhaps due to the smaller number of students or score variations, a detailed analysis could be challenging.

4. Duration and Correlation: It is noteworthy that no solid correlation was found between the frequency and duration of internet use across districts and countries. This might be the result of various socio-economic contexts or local policies.

Additionally, the study regarding parents' concerns and interests could indicate that if parents actively engage in understanding and discussing internet usage, it could positively influence students' usage patterns. This study could pave the way for further thought and research in this area, helping us understand how to enhance safe and effective internet usage for students with disabilities.

DISCUSSION

The current study aimed to investigate internet usage among socio-economically disadvantaged adolescents in five districts of Uttar Pradesh: Lucknow, Kanpur, Unnao, Sitapur, and Agra. This study had two primary objectives: first, to explore the self-reported internet usage among adolescents and their perceived parental involvement in that usage; and second, to identify which demographic factors are most strongly associated with internet usage and perceived parental involvement.

The results provide significant insights into the current internet usage of socio-economically disadvantaged adolescents and suggest key points for future programs aimed at promoting safe and responsible internet usage. A major strength of this study is that we were able to collect a sample of adolescents from socio-economically disadvantaged backgrounds across five districts of Uttar Pradesh. The consistency of the results across the districts argues for the generalizability of these findings.

Firstly, adolescents participating from these five districts had substantial access to the internet both inside and outside their homes. More than half of these youths reported using the internet more than 14 times a day, and nearly two-thirds spend three or more hours online daily. In terms of app popularity, Instagram, YouTube, and Snapchat were the most frequently used platforms.

Secondly, communication and involvement with parents varied among the adolescents. Fewer than half of the adolescents in this study often or always informed their parents about the websites they visited; however, the rate of disclosure was higher among girls compared to boys. Less than half of the adolescents reported that their parents had a fair amount or strong interest in their activities on the internet, yet again, girls indicated a higher level of parental interest than boys. More than half of the adolescents expressed that their parents were generally okay with their internet usage. Concerns were greater for girls, minority children, children with disabilities, children with more books at home, and those with lower grades, although uniformity was not observed across all districts.

Studies have shown a lack of parental involvement, which should be a cause for concern. Parental monitoring is considered a protective factor in relation to cyberbullying and other negative online experiences. The literature suggests that parents should strike a good balance between granting their child freedom in internet usage and actively monitoring online behavior, imposing clear restrictions, and being available when the child faces negative online experiences. The lack of interest from parents is linked to a higher likelihood of the child being victimized or subjected to cyberbullying. The current study indicates that lower parental involvement may pose greater risks for boys. The results of this study support this perspective, showing a moderate correlation between adolescents discussing their internet usage and the perceived interest from their parents.

LIMITATIONS

The study has several limitations that should be considered when interpreting its results. The first issue is that all data were self-reported by the adolescents, meaning we do not have information on the concerns and levels of involvement from the parents' perspective. This is an important aspect since parental monitoring and communication can significantly affect adolescents' online activities.

Secondly, the assessment of app popularity was based on an open-ended question. Thus, the reported most popular apps rely solely on recall and may not objectively represent actual usage statistics. This could lead to a lack of depth in the statistical analysis.

Thirdly, the results do not show any significant differences from other studies, which complicates generalization. As mentioned above, comparing the levels of socio-economic disadvantage across five districts was challenging, which could lead to substantial variations within the samples. Ultimately, this may influence the interpretation of the results or conclusions, and we must keep in mind that our findings may be affected by these limitations.

Considering these limitations, future research should attempt to gather more comprehensive and diverse data to better understand parents' perspectives and their online involvement, so that the viewpoints of both adolescents and their parents regarding internet usage can be included.



CONCLUSIONS

The conclusion confirms that adolescents in all five districts have easy access to the internet and spend a significant amount of time on it. This is particularly true for a large proportion of low-SES (socio-economic status) students in our samples. Parental involvement varies and is notable for this group. Adolescents indicated that most parents pay very little attention to online activities or generally agree with their children's internet use. It is true that most parents do not closely monitor their children's internet activities, and excessive use (such as social media and gaming) is often overlooked by them. However, showing interest, discussing what parents should and shouldn't do regarding internet use with adolescents, and emphasizing the importance of addressing issues when things go wrong are significant aspects of parental involvement. The study reveals that parental involvement is considerably lower for boys compared to girls. Therefore, it is important that parents receive appropriate training to recognize problematic internet use and to engage actively with their children's internet use in a constructive and cooperative manner.

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A JUDICIAL REVIEW ON STRENGTHENING CONSTITUTIONAL RIGHTS AND DEMOCRACY IN INDIA

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ABSTRACT

This judicial review critically examines the evolving landscape of constitutional rights and democracy in India, focusing on the role of the judiciary in safeguarding and enhancing these fundamental principles. The Indian Constitution, a beacon of democracy, enshrines a comprehensive set of rights aimed at fostering justice, liberty, equality, and fraternity among its citizens. However, the dynamic nature of society necessitates constant scrutiny and adaptation to ensure the relevance and effectiveness of these constitutional provisions. The review delves into landmark judicial decisions that have shaped the trajectory of constitutional rights and democracy in India. It analyzes cases that have addressed issues such as freedom of expression, right to privacy, equality before the law, and social justice. Additionally, it explores the judiciary's response to emerging challenges, including the intersection of technology and rights, social inequalities, and the protection of marginalized communities. Furthermore, the review examines the relationship between the judiciary and other branches of government, emphasizing the importance of checks and balances in preserving the democratic fabric. It scrutinizes instances where the judiciary has played a pivotal role in upholding the constitutional principles against potential encroachments by the executive and legislative branches, contributing to the overall resilience of Indian democracy. The study also investigates the efficacy of legal mechanisms, such as Public Interest Litigations (PILs), in addressing systemic issues and promoting social justice. It evaluates the judiciary's proactive stance in responding to public interest concerns, thereby enhancing its role as a guardian of constitutional values.

I. INTRODUCTION

During our freedom struggle, the leaders of the freedom movement had realised the importance of rights and demanded that the British rulers should respect rights of the people. The Motilal Nehru committee had demanded a bill of rights as far back as in 1928. It was therefore, natural that when India became independent and the Constitution was being prepared, there were no two opinions on the inclusion and protection of rights in the Constitution. The Constitution listed the rights that would be specially protected and called them 'fundamental rights'. The word fundamental suggests that these rights are so important that the Constitution has separately listed them and made special provisions for their protection. The Fundamental Rights are so important that the Constitution itself ensures that they are not violated by the government. Fundamental Rights are different from other rights available to us. While ordinary legal rights are protected and enforced by ordinary law, Fundamental Rights are protected and guaranteed by the constitution of the country. Ordinary rights may be changed by the legislature by ordinary process of law making, but a fundamental right may only be changed by amending the Constitution itself. Besides this, no organ of the government can act in a manner that violates them. As we shall study below in this chapter, judiciary has the powers and responsibility to protect the fundamental rights from violations by actions of the government. Executive as well as legislative actions can be declared illegal by the judiciary if these violate the fundamental rights or restrict them in an unreasonable manner. However, fundamental rights are not absolute or unlimited rights. Government can put reasonable restrictions on the exercise of our fundamental rights.

Right to Equality

- Equality before law – equal protection of laws
- Prohibition of discrimination on grounds of religion, race, caste, sex or place of birth – equal access to shops, hotels, wells, tanks, bathing ghats, roads etc.
- Equality of opportunity in public employment Abolition of Untouchability
- Abolition of titles

Right to Freedom

- ✓ freedom of speech and expression;
- ✓ assemble peacefully;
- ✓ form associations/unions;
- ✓ move freely throughout the territory of India;
- ✓ reside and settle in any part of India;
- ✓ practise any profession, or to carry on any occupation, trade or business.



- Protection in respect of conviction for offences
- Right to life and personal liberty
- Right to education
- Protection against arrest and detention in certain cases

Right against Exploitation

- Prohibition of traffic in human beings and forced labour
- Prohibition of employment of children in hazardous jobs
- Right to Freedom of Religion
- Freedom of conscience and free profession, practice and propagation of religion
- Freedom to manage religious affairs
- Freedom to pay taxes for promotion of any particular religion
- Freedom to attend religious instruction or worship in certain educational institutions
- Cultural and Educational Rights
- Protection of language, culture of minorities
- Right of minorities to establish educational institutions
- Right to Constitutional Remedies
- Right to move the courts to issue directions/orders/writs for enforcement of rights

II. RIGHT TO CONSTITUTIONAL REMEDIES

One would agree that our Constitution contains a very impressive list of Fundamental Rights. But merely writing down a list of rights is not enough. There has to be a way through which they could be realised in practice and defended against any attack on these rights.

Right to constitutional remedies is the means through which this is to be achieved. Dr. Ambedkar considered the right to constitutional remedies as 'heart and soul of the constitution'. It is so because this right gives a citizen the right to approach a High Court or the Supreme Court to get any of the fundamental rights restored in case of their violation. The Supreme Court and the High Courts can issue orders and give directives to the government for the enforcement of rights. The courts can issue various special orders known as writs. ± Habeas corpus: A writ of habeas corpus means that the court orders that the arrested person should be presented before it. It can also order to set free an arrested person if the manner or grounds of arrest are not lawful or satisfactory.

Mandamus: This writ is issued when the court finds that a particular office holder is not doing legal duty and thereby is infringing on the right of an individual.

Prohibition: This writ is issued by a higher court (High Court or Supreme Court) when a lower court has considered a case going beyond its jurisdiction.

Quo Warranto: If the court finds that a person is holding office but is not entitled to hold that office, it issues the writ of quo warranto and restricts that person from acting as an office holder.

Certiorari: Under this writ, the court orders a lower court or another authority to transfer a matter pending before it to the higher authority or court.

National Human Rights Commission (NHRC)

The real test of the rights given by any constitution is in their actual implementation. The poor, illiterate and the deprived sections of the society must be able to exercise their rights. Independent organisations like the People's Union for Civil Liberties (PUCL) or People's Union for Democratic Rights (PUDR) have been working as watchdogs against the violations of rights. In this background, the government has established in 1993 an institution, the National Human Rights Commission. The National Human Rights Commission (NHRC) is composed of a former chief justice of the Supreme Court of India, a former judge of the Supreme Court, a former chief justice of a High Court and two other members who have knowledge and practical experience in matters relating to human rights. The Commission's functions include inquiry at its own initiative or on a petition presented to it by a victim into complaint of violation of human rights; visit to jails to study the condition of the inmates; undertaking and promoting research in the field of human rights, etc. The Commission receives complaints in thousands every year. These relate to custodial death, custodial rape, disappearances, police excesses, failure in taking action, indignity to women, etc. Its most significant intervention has been on disappeared youth in Punjab and investigation and trial of Gujarat riot cases where its intervention proved effective. The Commission does not have the power of prosecution. It can merely make recommendations to the government or recommend to the courts to initiate proceedings based on the inquiry that it conducts.



Fundamental Duties of citizens

In 1976, the 42nd amendment to the Constitution was passed. Among other things, this amendment inserted a list of Fundamental Duties of Citizens. In all, ten duties were enumerated. However, the Constitution does not say anything about enforcing these duties.

- ± As citizens, we must abide by the Constitution, defend our country, promote harmony among all citizens, protect the environment.
- ± However, it must be noted that our Constitution does not make the enjoyment of rights dependent or conditional upon fulfilment of duties. In this sense, the inclusion of fundamental duties has not changed the status of our fundamental rights.

Democracy, Separation of Powers and the Judiciary

In a democracy, the Constitution reigns supreme, with the Judiciary serving as its guardian. Democracy allows people to participate in decision-making through elected representatives or direct involvement. The separation of powers divides governance into three branches: the Legislature makes laws, representing public interests; the Executive enforces laws, led by a President or Prime Minister; and the Judiciary interprets and applies laws, ensuring constitutional compliance and safeguarding rights. This separation prevents the concentration of power. In parliamentary systems like India, the Executive and Legislature are interdependent. The Judiciary acts as a vital check, upholding the Rule of Law and protecting against power abuses, ensuring a balanced democratic system.

III. ROLE OF AN JUDICIARY IN DEMOCRACY

India is the largest democracy in the world and any healthy democracy cannot thrive without an independent Judiciary. As a safeguard against potential violations of the Rule of Law, an independent Judiciary provides the guarantee that justice is carried out impartially. As Dr. B.B. Chawdhry writes, "Justice which is the soul of the state must be administered without fear or favour."

Various provisions have been included in the Indian Constitution to ensure an independent Judiciary. This includes the appointment of judges, salary and allowances, procedures on removal and even the power to penalise in case of violation of law.

The importance of an independent Judiciary is highlighted for various reasons. Firstly, the Judiciary serves as the first line of defence against any excessive or unauthorised power of the Executive or the Legislative branch, providing a system of checks and balances. Furthermore, the Judiciary examines and if needed, invalidates any law that violates the Indian Constitution by declaring it null & void. This prevents any centralisation of power. An impartial judicial system is essential for defending the rights of minorities & other marginalised groups in a multicultural and diversified nation like India. In addition, a strong independent Judiciary is essential to maintaining the Rule of Law. It ensures that everyone is governed by the same set of laws, irrespective of their position or power.

IV. JUDICIAL REVIEW

The Judiciary has the power to review any law or executive action that it considers violating the provisions of the Constitution. This power is exercised through the process of judicial review, which is the power of the Judiciary to declare a law or executive action unconstitutional. This power of judicial review has been instrumental in shaping the Constitution of India and ensuring that the provisions of the Constitution are implemented effectively. Judicial review is adopted by the Constitution of India from the Constitution of the USA.

In India, judicial review is broad in scope and deals with a variety of issues. The Supreme Court has the power of Judicial Review in various ways, including when there is a conflict between the Centre and States, or when there is a violation of the jurisdiction exercised by the Legislature and Executive. Most importantly, the Supreme Court is the guardian of Fundamental Rights. It protects the fundamental rights of Indian citizens, through issuing various writs provided under Article 32.

Some landmark cases are as follows;

Keshavananda Bharati vs. State of Kerala (1973)

An important turning point in Indian constitutional history was highlighted by this landmark case when the Supreme Court established the "basic structure doctrine." The Court ruled that although Parliament has the authority to amend the Constitution, it cannot change its basic structure. This historic decision outlined basic principles that serve as the cornerstone of Indian constitutionalism.

Indira Gandhi vs. Raj Narain (1975)

In this instance, the Supreme Court rendered a significant decision that made the proclamation of an emergency in India unlawful. The Court's ruling upheld the fundamental idea that nobody- not even the Prime Minister is above the law and the Constitution.

*Maneka Gandhi vs. Union of India (1978)*

By emphasising that any law denying a person their life or personal liberty must be just, fair, and reasonable, this case broadened the definition of personal liberty. It developed the idea of "procedure established by law" under Article 21, to ensure that any procedure established by law must be fair and just.

Vishakha vs. State of Rajasthan (1997)

This significant case involved workplace sexual harassment and prompted the creation of guidelines (known as the Vishaka guidelines) to address and avoid it. Through this ruling, the Court closed a gap in the law and set the stage for legislation to deal with workplace harassment.

Union of India v. Navtej Singh Johar (2018)

By invalidating Section 377 of the Indian Penal Code, which classified homosexuality as a crime and described it as 'carnal intercourse against the order of nature', the Supreme Court in this case decriminalised homosexuality. The ruling marked a key turning point in the acceptance of the LGBTQ+ community's rights.

Judicial Activism and PIL

Judicial Activism, born in the United States, empowers the judiciary to proactively protect citizens' rights by going beyond rigid interpretations of laws or the Constitution. It bridges legislative gaps, ensuring the safeguarding of fundamental rights when the legislature falls short. It adapts legal principles to evolving societal needs and acts as a check on executive authority, preventing overreach. This activism defends democracy, minorities, and marginalized groups while promoting equality, social justice, and good governance.

Public Interest Litigation (PIL) in India empowers citizens to address issues affecting the public at large, not just individually. The judiciary has actively used PILs to champion environmental protection, sustainable development, and wildlife preservation. It has been instrumental in upholding individual liberties, including the right to privacy, freedom of speech, and combating discrimination. Landmark judgments have also advanced education, women's rights, and decriminalized homosexuality, leading to significant social change.

Challenges

- Critics argue that Judicial Activism could weaken the separation of powers, leading to Judicial Overreach when the Court obstructs the legislative and executive branches.
- The Indian judicial system faces a significant backlog of cases, delaying justice and eroding public confidence. While some reforms have been initiated, more extensive changes are needed.
- Many Indians, especially disadvantaged groups, struggle to access legal services due to factors like limited legal knowledge, financial constraints, and inadequate infrastructure. To address this, efforts are needed to enhance legal literacy, provide affordable legal assistance, and make the legal system more user-friendly.

V. CONCLUSION

In conclusion, the Judiciary is a crucial component of Indian democracy and plays a far larger role than simply reading the law. It is the foundation of justice, defending personal freedoms, enforcing responsibility, and supporting the Rule of Law. However, issues still exist, including the need for better accessibility and the backlog of cases. A dynamic democracy like India must keep improving its judicial system, promoting transparency, and fortifying the systems that provide justice for all. The Court will continue to flourish as a bulwark of democracy through such initiatives, directing India toward a future of justice, equality, and the preservation of democratic ideals.

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THE CONSTRUCTIVE AND VITAL ROLE OF TEACHERS AND YOUTH IN NATION BUILDING

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ABSTRACT

The term nation building or national development is usually used to refer to a constructive process of engaging all citizens in building social cohesion, economic prosperity and political stability in a nation in an inclusive and democratic way. Going by the definition, it is seen that all citizens are to be involved in building or developing a nation. Thus, the involvement of youth in national development is a must. In fact, youths play one of the most important roles in nation building. Youth are not only the leaders of tomorrow, but also the partners of today. Young people are social actors of change and progress. They are a crucial segment of a nation's development. Young people in any country represent the future of that country. They have a vital role to play in the development of the country a duty they must perform. There are many ways that youth can contribute to national development. They can do so by working hard in any field they are involved in, be it the teaching, mechanic, or farming field. Education is the key for the success of an individual or development of a nation. Every child is entitled to an education in India, but unfortunately, not every child is getting a good and quality education. Teachers need to be seen as creators of knowledge and thinking professionals. A teacher needs to be an information provider, role model, facilitator, assessor, planner, resource and developer. Educated teachers, with wide knowledge, command the respect of fellow teachers and the people in their communities. The nation building task will be performed under the leadership of a brilliant set of teacher educators and master educators who will prepare the teachers and who in turn will develop the creative abilities of the teeming millions of the country. The paper discusses the role of youth and teachers in building the nation and promotion of skill development for the progress of the country.

KEY WORDS: *Quality Education, Nation Building, Teachers, Youth, Skill Development.*

INTRODUCTION

The youth is the future of the nation. Invest in them and you invest in the future.

Jawaharlal Nehru

Today the world is interconnected and interdependent. We are facing the challenges such as climate change, health epidemics, global poverty, global economic recessions and trade imbalances, assaults on human rights, terrorism, political instability, and international conflicts. It is important to recognize the crucial role of education in contributing to building a culture of peace and condemning instances in which education is undermined in order to attack democracy and tolerance. Educating young people to become global citizens will allow them to learn about the interdependence of the world's systems, believe that solutions to global challenges are attainable, and feel morally compelled to confront global injustices and take responsible action to promote a just, peaceful and sustainable world.

As a result of quick economic growth, influence of western culture, over mechanization, urbanization and craving for materialistic life there has been a loss of values and of the value system at the individual level and in the society as a whole. History speaks and universally accepted, the teachers are unchallenged custodian of the society and embodiment of evolutions and revolutions of the world. The kingpin in the schooling process is the teacher. If the teacher is personally committed to the values and practices them in his/her own life, the students will imbibe the values for which teacher stands. It is for this reason only those teachers who leave deep impact on their students are remembered and also revered. Therefore, if values have to be nurtured in children it would be crucial that their teachers function as role models.

The participation of teachers in the formulation and implementation of educational plans can yield rich dividends, especially in institutional planning and programmes of qualitative improvement. Several of the community improvement programmes and school programmes such as improvement of text books, adoption of better methods of teaching and evaluation, intensive utilization of available facilities, maintaining contact with community, individual guidance to students, inculcation of social and moral values etc do not need much investment in physical or monetary terms. But their success depends essentially upon the competence of the teachers, their sense of dedication and their identification with the interests of the students committed to their



care. But unless they make every effort to cultivate these skills and values they shall not be able to participate effectively in educational programmes and to discharge their responsibility to students and the society.

Enhance Participation of Youth

India needs more qualified engineers, plumbers, tailors, economists and journalists, etc to lead us to our developmental aspirations. However, to help our youth get to where they want and enable them become effective contributors to nation-building all hands must be on deck in achieving this objective, as the youth need support and motivation. Also to enhance the participation of youth in national development, they must be given the opportunity to effectively participate in decision-making processes, especially on issues affecting their lives.

Vision Ahead

India can become a developed nation only if everyone contributes to the best of his or her capacity and ability. Youth is wholly experimental and with the full utilization of the talents of the Youth, India will become a complete Nation. Let us hope for the same. The vision of our country lies in the hands of our youths. They are filled with tremendous and towering ambitions. It will be a great wastage of human resources if these youths are not given an opportunity to exercise their talent. This beautiful land needs these youths in order for our soil to become a brighter one. The primary role of young people is to get a good education in order to become better citizens of tomorrow. They need to learn skills to do the job that their country's economy needs. They also need to know how to read, write, think, understand, analyse, and discuss the issues their country faces. The entire success of the nation depends on the youths. However, in order for continuous success to take place; it is the Government's responsibility to provide the youth with proper facilities for, getting equipped with the knowledge of the modern era.

Role of Youth

The role of the youth is the most important in today's time. They have underplayed themselves in the field of the politics. Youth are strong forces in social movements. Youths are problem solvers. Our nations need them to resolve most of our problems. The nation is facing a lot of problems, and I believe that the youths are capable of solving them. They just need to be given a chance to prove themselves. Young participation is important because youth are the country's power. Youth recognize problems and can solve them. Youth are strong forces in social movements. They educate children about their rights. They help other young people attain a higher level of Intellectual ability and to become qualified adults.

Challenges ahead for Youth

- 1) The youth can play a vital role in the implementation of elimination of terrorism. If the energy, intelligence and resources of youth are fully and properly utilized the country will prosper.
- 2) The youth will have to compete with sporting spirit. Just look at the spirit of Internationalism that today prevails in the cricketing world. With the start of any cricket tournament, no matters which team wins, Cricket wins, Youthfulness will win. The spirit of oneness will win.
- 3) The youth would need to aspire for entrepreneurship rather than conventional employment.
- 4) The hopes of young people can be fulfilled only in conditions of peace, only in a civilized and cooperative world order.
- 5) Young people are full of vibrant ideas. When properly motivated and sufficiently guided they want in their life.
- 6) Young people have energy to try out things and the patience to learn from mistakes. Giving them opportunities to plan, to decide and to work prepares them to face harsher realities in life.
- 7) Young participation is important because youth are the country's power. Youth recognize problems and can solve them. Youth are strong forces in social movements. They educate children about their rights. They help other young people attain a higher level of Intellectual ability and to become qualified adults.

Teachers as Nation Builders

Teachers exhibit leadership in multiple, sometimes overlapping, ways. Some leadership roles are formal with designated responsibilities. Other more informal roles emerge as teachers interact with their peers. The variety of roles ensures that teachers can find ways to lead that fit their talents and interests. Regardless of the roles they assume, teacher leaders shape the culture of their schools, improve student learning, and influence practice among their peers. The changes that took place in schools have changed the roles of teachers, too. In the past teachers used to be the major source of knowledge, the leader and educator of their students' school life. Teachers would organize after-school activities. They used to be the authority in the class and often took over the role of parents. Nowadays, teachers provide information and show their students how to tackle them. Although they are still considered to be a kind of leader in the class, they can be thought of as facilitators in the learning process. They are supporters rather than educators and also advisors towards parents. This is high time when Teacher Education programmes should combine knowledge, experiences and dreams pertaining to the building of peace and harmony on one hand, and joint effort of other people and agencies of education on the other to create knowledge and thinking professionals. The teacher can be rightly called a nation builder. Teachers through their perseverance love and sacrifices have shown us the right path in which great men have built our



nation. It is our dear teachers who mould our character, our personality and show us the right direction which leads us to our final destination.

Role of Teachers

The key role of teacher is as facilitator and supportive to learning. Teacher is the one who facilitates learners to realize their potentials, articulate their personal and context specific experiences in ways that are acceptable in the wider context of our nation. Teacher needs to recognize him or herself as a 'professional' endowed with the necessary knowledge, attitude, competence, commitment, enthusiasm, spirit of seeking new ways and means, capable of reflection, sensitive and perceptive to not only the learners and the institution but also the emergent concerns in the larger social perspective within which one functions. Teacher has to recognise that learners in schools no more need teacher as a source of knowledge. The media explosion challenges their minds with the immense learning choices and possibilities. Teacher must develop an understanding of the nature and dynamics of 'action' comprising education. Such an understanding would not be a cognitive acceptance of things that occur but will prompt attempt to 'do' things, contemplate on 'what works and does not work', and critically analyse the pros and cons of the action, reflection and internalisation. The nation building task will be performed under the leadership of a brilliant set of teacher educators and master educators who will prepare the teachers and who in turn will develop the creative abilities of the teeming millions of the country.

CONCLUSION

Today it is important to recognize the crucial role of education in nation building and for contributing to build a culture of peace and condemning instances in which education is undermined in order to attack democracy and tolerance. Educating young people to become global citizens will allow them to learn about the interdependence of the world's systems, believe that solutions to global challenges are attainable, and feel morally compelled to confront global injustices and take responsible action to promote a just, peaceful, sustainable and developed society. Teaching should be practical, flexible and child-centered, there is a hope that the next generation of learners will get the support and skills they need in life during their schooling years from their own teachers. Teachers must provide students with motivation and interest for life-long learning and urge them to become, is essential in the education of the future. Teachers need to be seen as creators of knowledge and thinking professionals. A teacher needs to be an information provider, role model, facilitator, assessor, planner, resource and developer. Educated teachers, with wide knowledge, command the respect of fellow teachers and the people in their communities. The nation building task will be performed under the leadership of a brilliant set of teacher educators and master educators who will prepare the teachers and who in turn will develop the creative abilities of the teeming millions of the country.

The youths are our life and nation. They will make our country proud. The country will be recognized. The youths just need the support from their fellow citizens and they will perform their duties. Youth should stand against all the wrong doings in the country. Instead of blaming the system, young India should come together and with their toil should mould our nation for a better tomorrow. The youth should use their brains, strength, creativity and imagination to serve our nation and turn it into a developed one.

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EMOTIONAL ADJUSTMENT AMONG ADOLESCENT STUDENTS IN MINORITY WELFARE RESIDENTIAL SCHOOLS IN TELANGANA WITH RESPECT TO THEIR GENDER

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ABSTRACT

Emotional Adjustment is the condition or process of personal acceptance of and adaptation to one's circumstances, which may require modification of attitudes and the expression of emotions that are appropriate to a given situation. The present study was conducted on 200 Minority Welfare students from Ranga Reddy and Medchal districts of Telangana State. The result reveals that there was a significant difference in Emotional Adjustment among Minority Welfare students with respect to gender.

KEY WORDS: *Emotional Adjustment, Minority Welfare Schools.*

INTRODUCTION

Adjustment is the condition of a person who is able to adapt to changes in their physical, occupational, and social environment. In other words, adjustment refers to the behavioral process of balancing conflicting needs or needs challenged by obstacles in the environment. Due to the various changes experienced throughout life, humans and animals have to regularly learn how to adjust to their environment. Throughout our lives, we encounter various phases that demand continuous adjustment, from changes in career paths and evolving relationships to the physical and psychological shifts associated with aging. Each stage presents unique challenges and requires us to adapt in ways that support our growth and well-being. For example, when they are stimulated by their physiological state to seek food, they eat to reduce their hunger and thus adjust to the hunger stimulus. Successful adjustment equips individuals with a fulfilling quality of life, enriching their experiences as they navigate life's challenges.

Adjustment disorder occurs when there is an inability to make a normal adjustment to some need or stress in the environment. Those who are unable to adjust well are more likely to have clinical anxiety or depression, as well as experience feelings of hopelessness, anhedonia, difficulty concentrating, sleeping problems, and reckless behavior.

Adjustment as a process involves the ongoing strategies people use to cope with life changes, while adjustment as an achievement focuses on the end result achieving a stable and balanced state. Together, these models provide insight into how individuals adapt and reach well-being. Achieving successful adjustment offers individuals increased emotional resilience and an enriched quality of life. However, in times of high stress or significant challenges, some may resort to defense mechanisms like denial, displacement, or rationalization to manage their emotions. These coping strategies can provide temporary relief but may also prevent individuals from fully addressing the underlying issues. Adjustment is a vital problem of the modern world. Adjustment is a dynamic and continuous life long process.

Carter V. Good (1959) viewed, "adjustment is the process of finding and adopting modes of behaviour suitable to the environment or change in the environment."

Young adulthood is a period of adjusting to a new pattern of life and social expectations. It is an age when one tries to set up, an age when one focuses a lot of problems and critical situations still trying to adjust to the new acquired lifestyle. Adult would have to make big changes in their adjustments as developing new relationship is important and is the main factor of social adjustment. It is a time when person is expected to make some types of adjustments to live life successfully.

Emotional Adjustment is the condition or process of personal acceptance of and adaptation to one's circumstances, which may require modification of attitudes and the expression of emotions that are appropriate to a given situation.

Some strategies to Control Emotions

1. Taking a look at the impact of one's own emotions
2. Aiming for regulation, not repression



3. Identifying what you're feeling
4. Accepting your emotions
5. Keeping a mood journal
6. Taking a deep breath
7. Knowing when to express yourself
8. Giving yourself some space

Signs of Emotional Suffering

1. Personality change in a way that seems different for that person.
2. Agitation or displaying anger, anxiety or moodiness.
3. Withdrawal or isolation from others.
4. Poor self-care and perhaps engaging in risky behavior.
5. Hopelessness, or feelings of being overwhelmed and worthless.

To reduce Emotional exhaustion

1. Eating a healthy, balanced diet.
2. Eliminating or minimizing the stressor when possible.
3. Exercising.
4. Getting adequate sleep.
5. Identifying and challenging unhelpful thoughts and replacing them with balanced thoughts.
6. Practicing mindfulness to engage in the present moment.

Objective of the Study

To study the emotional adjustment problems of adolescent boys and girls in Telangana Minority Welfare Residential Schools

Hypothesis of the Study

Hypothesis: There will be no significant difference between the emotional adjustment among Telangana Minority welfare residential students in relation to their gender.

Sample of the Study

Survey method was adopted. Sample was selected in two phase.

- ❖ Selection of districts
- ❖ Selection of Minority welfare students (8th & 9th classes)

Selection of districts: In Telangana there are 33 districts. Out of which two districts were chosen viz. Ranga Reddy and Medchal Malkajgiri.

Table: Showing selected sample "District wise"

S.No	District	Number of Students
1	Ranga Reddy	100
2	Medchal Malkajgiri	100
Total		200

Selection of students: Students were selected from 2 schools. From each school students studying in 8th & 9th class were selected. Thus, total students sample was 200.

Tool of the Study**Adjustment Inventory for School Students (AISS)**

AISS was developed and standardized by A.K.P. SINHA, Ex-Professor of Psychology, Ravishankar University, Raipur and R.P. Singh, Professor and Head, Patna University, Patna in 1993. It seeks to differentiate well adjusted from poorly adjusted students in emotional, social, educational areas of adjustment. A total of 60 questions with 20 items per area of adjustment, were finalized from initial 100 questions with yes or no scoring. Elimination of questions was done by Judges (12), Non-significant discrimination in an initial 2 group study (14), Bi-serial correlation <0.001 in another sample of 370 (14).

Student Problems Inventory (SPI)

SPI Questionnaire was developed by researcher and adopted in the study. The Questionnaire is having 46 items in 4 categories Physical health and fitness (12), Family (11), Social (12), Educational (11) on yes - no scale, which is a collection of troublesome



issues often faced by many students in their day to day life. Repetition, ambiguity, discontinuity, overlap of areas in items was eliminated for validation of the questionnaire.

Analysis and Interpretation

Hypothesis: There will be no significant difference between the emotional adjustment among Telangana Minority welfare residential students in relation to their gender.

Table 1: Showing Emotional Adjustment Gender wise

Emotional Adjustment	Gender	N	Mean	SD	t	Sig.
	Boys	100	20.31	1.71	3.693	0.05
	Girls	100	17.18	2.21		
	Total	200	18.74	1.96		

**Significant at 0.05 level of significance*

From the above table, the mean score obtained for boys was 20.31 and girls was 17.18. The obtained t value 3.693 with a df of 1 & 198 was found to be statistically significant at 0.05 level of significance.

It was clear from the above table that t ratio for minority welfare students with emotional adjustment came out to be 3.693, which was highly significant at 0.05 level of significance.

Therefore, it may be concluded that, in the Minority welfare residential schools, boys were better than girls in emotional adjustment and it was statistically proved.

Hence the hypothesis, which states that 'There will be no significant difference between the emotional adjustment among Telangana Minority welfare residential students in relation to their gender', is **rejected** as majority of the sample was clear in accepting the significant role of gender in the emotional adjustment among Minority welfare students.

Findings

Emotional Adjustment: Boys in Minority welfare schools reported significantly higher difficulties in emotional adjustment compared to girls. This indicates that boys face more challenges in managing their emotions within the school environment. Boys also reported significantly higher difficulties in educational adjustment compared to girls. This highlights that boys face greater challenges in adapting to academic demands and achieving satisfactory educational outcomes.

Conclusion

Emotional adjustment refers to one's acceptance of self or self-concept. Emotional adjustment also referred to as personal adjustment or psychological adjustment, is the maintenance of emotional equilibrium in the face of internal and external stressors. This is facilitated by cognitive processes of acceptance and adaptation. The result of the study reveals that there is a significant difference with respect to gender in the emotional adjustment among Minority welfare students.

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AYURVEDIC MANAGEMENT OF KITIBHA KUSTA

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ABSTRACT

All the skin diseases in Ayurveda have been discussed under the broad heading of Kushta which is further divided into Mahakusta (7) and Kshudra Kusta(11). Kitibha Kusta is included under Kshudra Kusta which simulates with signs and symptoms of Psoriasis. Psoriasis is a proliferative autoimmune skin disease which is affecting 2% of worldwide population. It negatively impacts on patients quality of life. Psoriasis is chronic disorder which is commonly encountered in day today's clinical practices. As it is relapsing in nature it requires treatment for long duration. This disease characterised by scaling, thickened-rough skin lesions, itching, in severe cases covers entire body. Modern medical science treats psoriasis with Psoralen and Ultraviolet therapy (PUVA). But the disease has high recurrence rate and the modern medications have serious side effects like liver failure, renal failure, and bone marrow depletion etc. Here, Ayurveda treatment is under taken to provide safe and effective remedy for psoriasis. In this case study, 41 years old male patient had come to OPD of Kayachikitsa with chief complaint of Kandu (itching), dry silvery white patches over both the both lower limbs, scalp, abdomen and back treated with Shodhana Chikitsa (Body purification). Thus, this paper highlights a case study of Kitibha Kusta (Plaque Psoriasis) treated with Ayurvedic principles.

KEYWORDS: Kusta, Kitibha, Psoriasis, Snehapana, Virechana, Shamana.

INTRODUCTION

Psoriasis is a common, chronic, noncommunicable skin disease, with no clear cause or cure. The negative impact of this condition on people's lives can be immense. Psoriasis affects people of all ages, and in all countries. The reported prevalence of psoriasis in countries ranges between 0.09% and 11.43%, making psoriasis a serious global problem with at least 100 million individuals affected worldwide. Psoriasis has an unpredictable course of symptoms, a number of external triggers and significant comorbidities, including arthritis, cardiovascular diseases, metabolic syndrome, inflammatory bowel disease and depression. Psoriasis is characterized by the development of erythematous, well defined, dry, scaly papules and plaques of size ranging from a pinhead to palm sized or larger. The scales are abundant, loose, dry and silvery white. The most common type of psoriasis is plaque psoriasis causes dry, itchy, raised skin patches (plaques) covered with scales. It is autoimmune disease, overactive T cells attack healthy skin and trigger the production of more skin cells. They usually appear on the elbows, knees, lower back and scalp. After scraping the surface in plaque psoriasis lesion becomes red.

KITIBHA

In Ayurveda all the skin disease are broadly classified under the concept of Kushta which is divided into Mahakushta and Kshudrakushta. Kitibha Kushta is one among Kshudra Kustas where the signs and symptoms of which simulates with that of Plaque psoriasis. Kitibha Kusta having symptoms like Shyava Varna (Blackish brown discoloration of skin), Kinakhara Sparsha (rough in touch/scaly), Parushatva (hard), Ruksha (dry). Every Kusta manifests due to dearrangement of seven factors like Vata, Pitta, Kapha, Twak (skin), Rakta (blood), Mamsa (Muscle) and Lasika (lymphatic system). Their Doshik identity can be established on the basis of dominance of Dosha in the Samprapti. Thus Kitibha kustha is Vata Kaphaja phenomenon. According to Acharya Charaka as a Samanya Chikitsa, disease with Bahudoshavastha necessarily needs to be treated with Shodhana line of management for elimination of aggravated doshas. As the multiple lesions were found in Adhobhaga, Virechana was chosen as a line of treatment for Shodhana. Shodhana, Shamana and Nidana Parivarajana are main line of treatment for any disease.

CASE REPORT

A patient, aged 41 years, male had come to OPD of Kayachikitsa Gopabandhu Ayurveda Mahavidyalaya And Hospital, complaining of whitish scaly patches over scalp associated with itching, dry scaly lesions over both lower limbs, abdomen, back associated with severe itching and pain since 2 year.

CHIEF COMPLAIN

Whitish Brown inflamed skin lesions over the chest and back region 2 year. Severe itching over chest, upper limb, lower limb and back area since 2 year.



Whitish scaly patches over scalp associated with itching, mainly over frontal region of scalp since 5 month.

HISTORY OF PRESENT ILLNESS

Patient was apparently well before 2 years and gradually whitish brown, rough and whitish scaly lesions associated with itching. Initially found over bilateral elbow succeeding over both lower limbs, abdomen, back associated with severe itching and pain. Took symptomatic treatment with the Ayurvedic medications. As he did not find any relief he was admitted on August 17th 2023 at IPD of department of Kayachikitsa, and underwent Virechana.

HISTORY OF PAST ILLNESS

He had no known case of Diabetic mellitus (DM) Hypertension (HTN) Pulmonary Tuberculosis (PTB) and Thyroid disorder

FAMILY HISTORY

Family history in first-degree relation was negative

PERSONAL HISTORY

Appetite: Moderate

Bowel: Irregular with constipated

Micturition: 5-6 times/day

Sleep: Sound

GENERAL EXAMINATION

Appearance: Normal

Built: Moderate

Nourishment: Moderate

Pallor: +

Icterus: Absent

Oedema: Absent

Cyanosis: Absent

VITAL DATA

Pulse: 78 /Min

BP: 120/90 MmHg

Respiratory Rate: 20/Min

Temp: Afebrile

Weight: 60 kg

<i>Astha Vidha parikshya</i>	Observation
<i>Nadi</i>	<i>Vataja (78/min)</i>
<i>Mala</i>	<i>Baddha kosta</i>
<i>Mutra</i>	<i>4-5 times/day</i>
<i>Jihwa</i>	<i>Malabruta</i>
<i>Sabda</i>	<i>Spastha</i>
<i>Sparsha</i>	<i>Anushna sita</i>
<i>Drik</i>	<i>Prakruta</i>
<i>Akriti</i>	<i>Madhyama</i>

<i>Dasavidha parikshya</i>	Observation
<i>Prakriti</i>	<i>Vata- Kaphaja</i>
<i>Vikriti</i>	<i>Tridoshaja</i>
<i>Sara</i>	<i>-</i>
<i>Samhanana</i>	<i>Madhyama</i>
<i>Satmya</i>	<i>Pravara</i>
<i>Satwa</i>	<i>Avara</i>
<i>Aharasakti</i>	<i>Madhyama</i>
<i>Vyayamasakti</i>	<i>Madhyama</i>
<i>Vaya</i>	<i>Madhyama</i>
<i>Bala</i>	<i>Madhyama</i>



Local examination

- 1) Site of lesion - (Pidaka sthana) – chest region, abdomen, back, scalp region, arm and leg
- 2) Distribution - (Vyāpti)- symmetrical
- 3) Character of lesion - (Pidaka Lakshanas) :
no of lesions- multiple;
Size= 1-2 cm,
Colour- black, Arrangement- solitary
- 4) Itching - Present; Severity- severe
- 5) Inflammation – Absent
- 6) Discharge – Occasional watery discharge
- 7) Superficial Sensation on lesion – Hardness of lesions with scaling

LAB INVESTIGATION

Total WBC count – 7900 cells/mm³ (N-66%, E-10%, B-0, L-24%, M-0)
ESR- 55 mm/hr
Hb %- 11gm%
FBS- 88 mg/dl
PPBS-126 mg/dl

ASSESSMENT OF CLINICAL FEATURES BASED ON GRADATION SYSTEM

1. Shyavam

Normal Skin Tone -0
Mild Brownish Discoloration-1
Moderate Brownish discoloration -2
Severe Brownish Discoloration -3

2. Kinakara Sparsha

Normal Skin texture-0
Mild rough lesions on touch-1
Moderate rough lesions on touch-2
Severe rough lesions on touch with scaling-3

3. Parushatwa

Normal Skin-0
Mild Hardness of lesions -1
Moderate Hardness of lesions -2
Severe Hardness of lesions with scaling-3

4. Kandu

No itching-0
Mild/occasional localized itching which is tolerable-1
Moderate generalised itching -2
Very severe itching disturbing sleep and other activity-3

Result and Discussion

After starting of treatment symptoms were decreased in 1 month. In the period of 3 months, the patient showed significant improvement with no signs of recurrence.

Symptom	Before Treatment	After Treatment
Shyava	3	1
Kinakharasparsha	3	0
Parushatwa	3	0
Kandu	3	0

TREATMENT GIVEN

For sodhana chikitsa the line of treatment-



1. Deepan-Pachan: Chitrakadi vati(125mg) 1tablet twice daily with Luke-warm water for three days(1st day,2nd day,3rd day) before food.
2. Snehapana: Panchatiktaka ghrita
 - a. 4th day – 30 ml
 - b. 5th day - 60 ml
 - c. 6th day – 90 ml
 - d. 7th day – 120 ml
 - e. 8th & 9th day – Abhyanga with Bruhat dantapala taila and Sarvanga sweda
3. Virechan: On 10th day virechan with the help of Trivrut avaleha-30ml and Abhayadi modak 2tablet. Patient had 12 vegas during Virechana Karma. It was Madhyama Sudhhi and Madhyama bala Patient.
4. Samasrajan karma: Next 05 days Samsarjan karma with 2 annakala was explained to the patient. Samsarjana Karma was included Peya, Vilepi, Yusha, Krushara for 5 days.

The internal and external medications are listed in Table 1

1.	Mahamanjistadi kashay	10ml twice daily with half cup luke warm water before food.
2.	Arogyavardhini vati	1tab Twice Daily With Luke Warm Water
3.	Kaisore guggulu	2 Tab Twice Daily With Luke Warm Water
4.	Psorakot tablet	1 Tab Twice Daily With Luke Warm Water
5.	Bruhat dantapala taila	For local application.

Table .1

Diet Plan and life style modification

- Patient was advised not to take sour, bitter, spicy food as well as junk food, fried items and curd.
- Going to bed in proper time.
- Advised for pranayama

DISCUSSION

After taking proper history, nidana for the disease were identified. Depending on lakshana and Dosha predominance the treatment was planned i.e. Virechana Karma followed by Shamanoushadi along with Nidana Parivarjana. Amapachana was achieved by administration of Chitrakadi Vati as it has kaphaghna, vataghna and ama dosha nashaka properties. And thus does agni deepana. Then Snehapana with Panchatiktaka ghrita As this ghrita is tikta pradhana , kaphahara and it is indicated in kushta vikara. Adding saindhava lavana to it pacifies Vata dosha also. And adding shunthi churna to it helps in pacifying kapha Dosha also. Ghrita lubricates and

Softens the Dosha, improves Digestive power, regulises bowel, improves the strength and complexion. Abhyanga with Bruhat dantapala taila does Vata Shamaka, Kandughna and Rukshaghna. It was followed by Nadi sweda as it have Kandughna and Kusthaghna properties. It helps in opening pores of skin. Abhyanga and Nadi Sweda was administered to achieve Dosha Shithilikarana and brings Dosha from Shakha to Kosta. Virechana Karma as Administered with Trivrit Lehya does Pittaghna, Vatanulomana and pacifies sukha virechaka. After Shodhana followed by Samsarjana Krama, the patient was administered with Gandhaka Rasayana, Mahamanjisthadi Kashaya, and Arogyavardhini vati.

BEFORE TREATMENT



**AFTER TREATMENT****CONCLUSION**

This case study is documented evidence for effective management of Kitibha Kustha by Ayurvedic protocol. Shodhana Karma helps to remove the root cause of the disease and prevents the disease from its reoccurrence by eliminating aggravated Doshas in the body relieving the no of lesions, size of the lesions, bringing back the skin colour into normalcy and the orally prescribed medicines also played a vital role in alleviating the symptoms and worked as Immune booster.

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AYURVEDIC MANAGEMENT OF SIDHMA WSR TO TINEA VERSICOLOR

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ABSTRACT

Skin disorder constitutes one of the largest groups of health problems in general practice. Good skin is an integral part of health. In Ayurveda, all skin diseases are explained under a single heading of Kushta. Sidhma Kushta is an Oupasargikaroga. All Kushta is due to aggravation of Tridosas. These aggravated Dosha vitiates Dushyas like Twak, Raktha, Mamsa and Ambu by circulating in them and produce Vaivarnya. According to Susrutha, whenever the aggravated Doshas get stagnated, Mandalas appear at that site. Kushta are innumerable in number based on the permutation and combination of Doshas and Dushyas, but mainly they are divided into seven Maha Kushta and eleven Kshudra Kushta. Sidhma is a variety of Kushtaroga according to all the authors of Brihathrayi and Laghutrayi. However, Charaka classified it under Maha Kushta and other Acharyas like Susrutha and Vagbhata brought it under Kshudra Kushta. By Dalhana's commentary it can be understood that Sidhma is of two types, Sidhma Kushta and Pushpitha Sidhma. Symptoms of Tinea versicolor are similar to that of Lakshanas of Sidhma Kushta, Acharya Susrutha has said that Krimi is also one of the cause for Kushta and Tinea versicolor is a superficial mycoses caused by a fungi called *Malassezia furfur*. Understanding of Lakshanas and Samprapti plays an important role in the diagnosis, prognosis and treatment of the disease. So, an attempt is made to analyse and understand the concept of Sidhma Kushta.

KEYWORD : Kushta roga, Sidhma kushta, Tinea versicolor.

INTRODUCTION

Sidhma is a variety of Kushta. It is commonly seen in all the seasons; aggravation of symptoms can be seen in Greeshma Ritu and also in the humid climate. Sidhma is a Vata Kaphaja Kushta. It has symptoms like Vaivarnya (Swetha, Tamra), Kandu and Rajaprapthi. General causative factors explained in Kushta are to be considered for Sidhma Kushta also. According to Rasendra Sara Sangraha, by treating one Kushta patient the Vaidya gets Punya of Koti Kanyadaana (one crore marriages), offering Tarpana to ancestors at the banks of river ganga or benefits gained while residing in Kailasa. It shows the importance of proper treatment. Kushnaati Rogan Kush + Hani Kushiti i.e. Kushta gives an ugly look to the body. When vitiated Doshas provokes the four body elements & if this derangement of seven Dravyas is not treated then disease is formed inside the body which manifests itself on the outermost part of the body which produces Kushta. According to Arunadatta, Kushta is defined as that which causes disfigurement to the body. Bhrajaka Pitta is located in this layer and gives colour and texture to the skin. According to Charaka, Sidhma is occurs in the Triteeyaka layer of skin, but Susrutha explains it is in the Avabhasini layer.

CASE REPORT

A 11-year-old boy came to the OPD of G.A.M, Puri with the presenting complaints- thick brownish coloured round lesions on the left side cheek of the face which appears dry and scaly when gets dry and also associated with itching thick brownish coloured round lesions on the left side cheek of the face which appears dry and scaly when gets dry and also associated with itching. The complaints started about two years back

HISTORY OF PRESENT ILLNESS

Patient was apparently well before 2 months and gradually thick brownish coloured round lesions on the left side cheek of the face which appears dry and scaly when gets dry and also associated with itching. In beginning for which he took allopathic medication and got relief. But with the withdrawal of medication, the lesions began to reappear on same region which also associated with itching. Then he started taking Ayurvedic medicines since 1 month

HISTORY OF PAST ILLNESS

NIL

**FAMILY HISTORY**

Family history in first-degree relation was negative

PERSONAL HISTORY

Appetite: Moderate

Bowel: Irregular with constipated

Micturition: 5-6 times/day

Sleep: Sound

GENERAL EXAMINATION

Appearance: Normal

Built: Moderate

Nourishment: Moderate

Pallor: +

Icterus: Absent

Oedema: Absent

Cyanosis: Absent

VITAL DATA

Pulse: 78 /Min

BP: 110/70 MmHg

Respiratory Rate: 20/Min

Temp: Afebrile

Weight: 35 kg

<i>Asthavidha parikshya</i>	Observation
<i>Nadi</i>	<i>Vataja (78/min)</i>
<i>Mala</i>	<i>Baddha kostha</i>
<i>Mutra</i>	<i>4-5 times/day</i>
<i>Jihwa</i>	<i>Malabruta</i>
<i>Sabda</i>	<i>Spastha</i>
<i>Sparsha</i>	<i>Anushna sita</i>
<i>Drik</i>	<i>Prakruta</i>
<i>Akriti</i>	<i>Madhyama</i>

<i>Dasavidha parikshya</i>	Observation
<i>Prakriti</i>	<i>Vata- Kaphaja</i>
<i>Vikriti</i>	<i>Tridoshaja</i>
<i>Sara</i>	-
<i>Samhanana</i>	<i>Madhyama</i>
<i>Satmya</i>	<i>Pravara</i>
<i>Satwa</i>	<i>Avara</i>
<i>Aharasakti</i>	<i>Madhyama</i>
<i>Vyayamasakti</i>	<i>Madhyama</i>
<i>Vaya</i>	<i>Madhyama</i>
<i>Bala</i>	<i>Madhyama</i>

LAB INVESTIGATION

Total WBC count – 7900 cells/mm³ (N-66%, E-10%, B-0, L-24%, M-0)

ESR- 12 mm/1hr

Hb %- 11gm%

TREATMENT GIVEN

For sodhana chikitsa the line of treatment-

1. Deepan-Pachan: Chitrakadi vati(125mg) 1/2 tablet twice daily with Luke-warm water for three days(1st day,2nd day,3rd day) before food.

2. Snehapana: Panchatiktaka ghrita

a. 4th day – 10 ml

b. 5th day - 20 ml



c. 6th day – 40 ml

d. 7th day – 50 ml

e. 8th & 9th day – Abhyanga with Bruhat dantapala taila and Sarvanga sweda

3. Virechan: On 10th day virechan with the help of Trivrut avaleha-10ml and Abhayadi modak 1/2tablet. Patient had 7 vegas during Virechana Karma. It was Madhyama Sudhhi and Madhyama bala Patient.

4. Samasrajan karma: Next 05 days Samsarjan karma with 2 annakala was explained to the patient. Samsarjana Karma was included Peya, Vilepi, Yusha, Krushara for 5 days.

The internal and external medications are listed in Table 1

1.	Mahamanjistadi kashay	10ml twice daily with half cup luke warm water before food.
2.	Arogyavardhini vati	60 mg tab twice daily with luke warm water
3.	Kaisore guggulu	60mg tab twice daily with luke warm water
4.	Bruhat dantapala taila	For local application.

Diet Plan and life style modification

- Patient was advised not to take sour, bitter, spicy food as well as junk food, fried items and curd.
- Going to bed in proper time.
- Advised for pranayama

DURATION OF TREATMENT:- 45 Days

DISCUSSION

After taking proper history, nidana for the disease were identified. Depending on lakshana and Dosha predominance the treatment was planned i.e. Virechana Karma followed by Shamanoushadi along with Nidana Parivarjana. Amapachana was achieved by administration of Chitrakadi Vati as it has kaphaghna, vataghna and ama dosha nashaka properties. And thus does agni deepana. Then Snehapana with Panchatiktaka ghrita As this ghrita is tikta pradhana, kaphahara and it is indicated in kushta vikara. Adding saindhava lavana to it pacifies Vata dosha also. And adding shunthi churna to it helps in pacifying kapha Dosha also. Ghrita lubricates and Softens the Dosha, improves Digestive power, regulates bowel, improves the strength and complexion. Abhyanga with Bruhat dantapala taila does Vata Shamaka, Kandughna and Rukshaghna. It was followed by Nadi sweda as it have Kandughna and Kusthaghna properties. It helps in opening pores of skin. Abhyanga and Nadi Sweda was administered to achieve Dosha Shithilikarana and brings Dosha from Shakha to Kostha. Virechana Karma as Administered with Trivrit Lehya does Pittaghna, Vatanulomana and pacifies sukha virechaka. After Shodhana followed by Samsarjana Karma, the patient was administered with Gandhaka Rasayana, Mahamanjisthadi Kashaya, and Arogyavardhini vati.

BEFORE TREATMENT





AFTER TREATMENT



CONCLUSION

This case study is documented evidence for effective management of Sidhma Kustha by Ayurvedic protocol. Shodhana Karma helps to remove the root cause of the disease and prevents the disease from its reoccurrence by eliminating aggravated Doshas in the body relieving the no of lesions, size of the lesions, bringing back the skin colour into normalcy and the orally prescribed medicines also played a vital role in alleviating the symptoms and worked as Immune booster.

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STICK TO IT: A COMPREHENSIVE REVIEW OF TRANSDERMAL PATCH TECHNOLOGY

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ABSTRACT

An innovative way to medication distribution, transdermal patches provide a regulated, non-invasive, and patient-friendly substitute for conventional techniques. Transdermal patch technology is thoroughly reviewed in this article, which also examines its fundamental ideas, essential elements, and many medical treatment uses. Advances in adhesive and matrix technologies, the mechanics of medication absorption via the skin, and methods for overcoming obstacles such as skin irritation and restricted permeability are among the topics discussed. Recent advancements including smart patches with real-time monitoring features and patches augmented by microneedles are also highlighted in the review. The potential of transdermal patches to transform healthcare delivery and open the door to more effective and individualized treatment solutions is highlighted in this article by discussing both the advantages and disadvantages of this technology.

KEYWORDS: Transdermal patches, TDDS, Enhancer for Permeation, Folding endurance, permeability.

1. INTRODUCTION

Through the use of a special membrane, a patch of transdermal —also called to as a patch of skin—it controls the rate at which the medication in the liquid form in the reservoir inside the transdermal patch can pass through the skin and into the blood stream. For few medications to be utilised in a skin patch, they must be mixed with substances that improve their penetration of the skin, including alcohol. Medications that are applied as skin patches include nitro-glycerin (for angina), nicotine (for quitting smoking), oestrogen (for menopause and to prevent osteoporosis after menopause), lidocaine (for shingles pain; herpes zoster) and scopolamine (for motion sickness). However, some chemicals, like molecules of insulin, are very big to fit by way of the epidermis. Applying transdermal patches to the skin removes the need for pumps or syringes to gain vascular entry. In the 1970s, these patches were created, and the FDA authorised the first one in 1979 to cure motion sickness. [1, 2]. Delivering a amount of therapeutically effective medication through the skin of patient is the aim of TDDS (transdermal drug delivery systems) [3–4].

Traditional drug regimens that call for many doses have a lot of issues and side effects; include less bioavailability because of first pass metabolism of hepatic. TDDS takes this away. For these medications, the aim of dosage design is to optimise the flow of medication into the systemic circulation through the skin while reducing metabolism in the skin and drug retention [5]. Self-contained, discrete dose forms known as TDDS (transdermal drug delivery systems) can be used to healthy skin to allow the drug or drugs to enter the bloodstream at a regulated pace. Transdermal administration is acknowledged as a viable method for both local and systemic medication delivery [6]. TDDS not only allows for the drug of continuous injection with short biological half lives but TDDS also avoids pulsed entry into the bloodstream, which often leads to undesirable side effects. It also provides consistent, controlled drug administration. Novel medication delivery approaches have emerged, including transdermal drug administration methods, controlled release system and transmucosal drug delivery systems [7].

1.1 Definition

A transdermal patch or skin patch also called as medicated adhesive patch is applied to the skin for the purpose of deliver a specific medication amount into the bloodstream through the skin. [8]

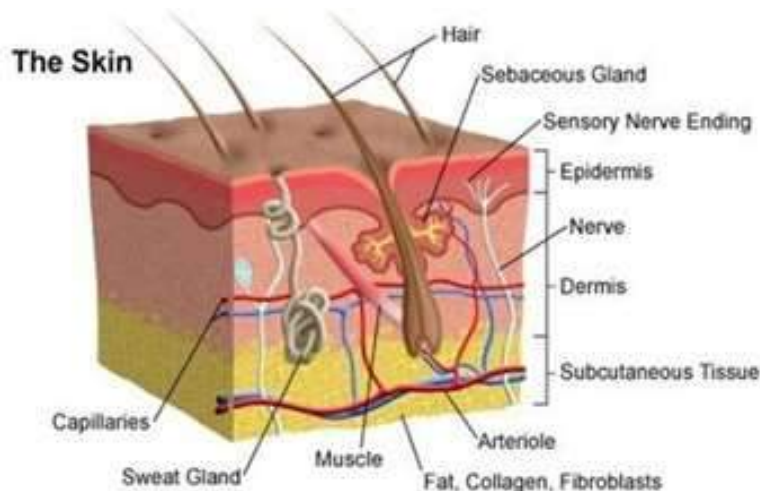


Figure 1. Structure of skin for transdermal drug delivery systems

2. TRANSDERMAL DRUG DELIVERY ADVANTAGES [9-14]

1. TDDS is a system of drug delivery that applies a gadget, which is called a patch, to the surface of skin enters into the systemic circulation at a predetermined concentration for therapeutic advantage. This prevents other restrictions brought on by another dosage forms.
2. TDDS provides consistent drug penetration through the skin, resulting in a steady serum drug level, which is the therapeutic objective.
3. For patients who have trouble taking medications orally, It can be used in place of the oral drug administration method.
4. Patients who are unconscious or feel queasy can use it as an alternative.
5. Since there won't be any direct drug delivery, patients with gastrointestinal issues can receive medication through TDDS.

3. DISADVANTAGES

1. Because of one or more than one system components, some of the patients develop contact dermatitis at the site of application, necessitating treatment discontinuation.
2. Because the skin's imperability naturally limits drug entrance, these patches are only appropriate for drugs which are powerful.
3. Few medications are painful, such as the transdermal patch of scopolamine, which is applied behind the ear.
4. Adhering for a long time is challenging. [15, 16]

4. TRANSDERMAL PATCH: [17-20]

To deliver the specific medication quantity into the bloodstream through the skin at a predetermined rate of release, a adhesive medicinal patch (transdermal patch) which is put to the skin above the epidermis. The most popular transdermal technology available today is mostly based on patches, which are semi-permeable membranes. A TDDS (transdermal drug delivery system), often known as "transdermal patches" and "skin patches," is therapeutically effective dose form that is meant to be injected into a patient's bloodstream through their skin.



Figure 2. Structure of Transdermal Patch

**5. APPLICATIONS OF TRANSDERMAL PATCHES [37-39]**

- The patch of nicotin, which helps people quit smoking tobacco by releasing nicotine in controlled dosages, so it is the most famous transdermal patch in the US.
- Two opioid drugs, buprenorphine (marketed as BuTrans) and fentanyl (marketed as Duragesic), are frequently administered in patch form to treat extreme pain 24/7.
- Menopausal symptoms and postmenopausal osteoporosis are occasionally treated with oestrogen patches. The patch of contraceptive (also known as Ortho Evra or Evra) is another transdermal patch for hormone delivery.

6. TRANSDERMAL PATCHES' CONSTITUENT PARTS

1. Matrix of Polymers: The polymer regulates the release of drug from the device. To be used in the transdermal patches, a polymer must meet the following requirements.

Types of polymers include:

- a) Natural polymers:** which include starch, gum, shellac, proteins, gelatin, cellulose derivatives, and waxes.
- b) Artificial Elastomers:** Neoprene, Nitrile, Acrylonitrile, Hydrin Rubber, and Silicone Rubber.
- c) Synthetic polymers:** include epoxy, polyvinyl chloride, polyvinyl alcohol, polypropylene, polyethylene, polyamide, and polyurea.

2. Drug: -The solution of drug in close proximity to the release liner.

Physiochemical Characteristics

- a) The medication's molecular weight should be under 1000 Daltons.
- b) Both lipophilic and hydrophilic phases should be favoured by the medication.
- c) The drug's melting point should be low.

3. Enhancer for Permeation: The flow of the drug J. can be inscribed through the skin. Given that

$$J = D \frac{dc}{dx},$$

J represents the flux.

D is an acronym for diffusion coefficient.

C represents the concentration of the diffusing spectrum.

X is a coordinate in space.

4. Extra excipients: (a) Adhesives: The device's face or back can be covered with the pressure-sensitive adhesive.

- i) It must not cause irritation.
- ii) It must be removed simply.
- iii) It shouldn't leave behind any residue that is impossible to wash off.
- iv) It must have superior skin contact.
- v) Compatibility with the drug both chemically and physically.
- vi) Drug penetration shouldn't be impacted.

5. Linear: - Protect the patch during the time of storage. The linear is removed before to usage.

6. Backing: - Shield the transdermal patch from the weather. [21–30]

7. Elements that influence transdermal bioavailability [31–36]

The drug's transdermal bioavailability is influenced by two main factors:

1. Physicochemical Elements

(a) Hydration of the skin: When the skin and water comes in touch, its permeability increases crucial element boosting skin penetration is hydration. Thus, transdermal delivery is the method used to apply humectant.

(b) pH and temperature: Changes in pH cause a tenfold increase in medication penetration. When the temperature decreases, the diffusion coefficient also decreases. How weak bases and weak acids separate is determined by the pKa or pKb and pH values. The unionised drug's percentage in the skin indicates the concentration of drug. Therefore, two crucial variables influencing medication penetration are pH and temperature.

2. Aspects of Biology

(a) Skin condition: Many solvents, including methanol and chloroform, as well as acids and alkalis, harm skin cells and encourage penetration. Skin conditions change when a patient is ill. Although healthy skin provides a better barrier, penetration is impacted by the aforementioned factors.

(b) Skin age: Younger skin has a higher permeability than older skin. Children are especially susceptible to pollutants absorbing via their skin. Therefore, skin age a main parameters that affect penetration of medication in transdermal drug delivery system.



8. EVALUATION METHODS: [40–51]

1. Patch thickness: Using a digital micrometre, the thickness of the drug-loaded patch is measured at various spots. The average thickness and standard deviation are then calculated to guarantee the thickness of the created patch.

2. Weight uniformity: Before testing, the produced patches must be dried for four hours at 60°C. A predetermined patch area must be sliced into several sections and weighed using a digital balance. From the individual weights, the average weight and standard deviation values must be computed.

3. Folding endurance: a strip of a particular material has to be cut uniformly and folded repeatedly until it breaks. The folding endurance was determined by counting the number of times the film could be folded in the same spot without breaking.

4. The percentage Content of moisture: Each manufactured film must be weighed separately and stored in a desiccator, keeping fused calcium chloride for a whole day at room temperature. The films must be reweighed after a day in order to calculate the moisture content as a percentage using the formula below.

Percentage moisture content = [Initial weight- Final weight/ Final weight] ×100.

5. Moisture uptake percentage: To maintain 84% relative humidity, the weighted films must be stored at room temperature for 24 hours in a desiccator filled with a saturated potassium chloride solution. Following a 24-hour period, the films must be reweighed in order to calculate the percentage moisture uptake using the formula below.

Percentage moisture uptake = [Final weight- Initial weight/ initial weight] ×100.

6. Drug content: A predetermined patch area needs to dissolve in a predetermined volume of an appropriate solvent. After passing the solution through a filter medium, the drug content must be examined using the appropriate technology (either the UV or HPLC method). The average of three separate samples is shown by each value.

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A CRITICAL ANALYSIS OF THE DOWRY PROHIBITION ACT IN INDIA

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"Any young man, who makes dowry a condition to marriage, discredits his education and his country and dishonors womanhood." - Mahatma Gandhi

ABSTRACT

In 1961, India implemented the Dowry Prohibition Act in an effort to eradicate the long-standing social evil of dowries. Despite legal prohibitions, dower-related offenses continue to occur, bringing to light intricate social, institutional, and economic problems. This critical study demonstrates the limited effectiveness of the Dowry Prohibition Act in addressing the intricate nature of dowry intimidation and violence. Using historical context, legal frameworks, and current instances, this study investigates the factors that lead to dowries, including as gender inequality, economic pressures, and institutional flaws. Education hasn't made dowries less common, and crimes like cruelty (section 498A, IPC) and dowry murders (section 304B) are becoming more common. Based on the difficulties encountered during the Act's implementation and the suggestions made by the National Women Commission, this research paper provides remedies. In order to eradicate dowries and preserve women's dignity in India, this research emphasizes the necessity of comprehensive remedies that include societal activities, legal reforms, and victim support networks. The law defines 'DOWRY' and criminalizes any behavior associated with it. The National Women's Commission suggested in 2009 that the dowry word be changed and that protection officers are appointed through the Domestic Violence Act to perform the duties of dowry prevention officers. The bill is currently being evaluated for more consideration after the suggested adjustment was met with resistance.

KEYWORDS; Dowry, Legislation, Women, Prohibition, Punishment

INTRODUCTION

A social ill that is ingrained in our culture is dowries. Particularly damaging to women are offenses relating to dowries, such as death, suicide, homicide, and order violations. Women have a vital role in maintaining human experiences and historical social norms. It is extremely difficult for women to earn respect from individuals throughout their life. Discrimination starts the moment a woman is born. Women are God's greatest gift to humanity. She is able to distinguish between good and bad. In addition to cooking, cleaning, and edging, women are in charge of childbearing and parenting. They have no authority and are in charge of a man's welfare, which makes them unfit for positions of authority. The battle for criminal equality has been a top priority for women's movements across the world. Because of their bulging lower backs, Indian women were considered a broken part of society for many decades. There is a major conflict about independence at one point in the territory. There is a major conflict about independence at one point in the territory. Gandhiji declared his unflinching support for the liberation of women and argued for women's freedom.

Reputation is not influenced by physical appearance or gender. The Indian government tried to eradicate the centuries-old social evil of dowries in 1961 with the passage of the Dowry Prohibition Act. Despite its admirable intentions, the Act has faced criticism and challenges over time. This article examines the Dowry Prohibition Act's benefits, drawbacks, and ongoing debate on its applicability.

Dowry as a Social Evil in Historical Context

India's centuries-old custom of dower has important social and cultural ramifications. Prior to marriage, the bride's family gives the groom's side a gift or money. Brides who are unable to meet dowry demands may face threats, violence, or even death as a result of the pervasive and exploitative practice of dowry.



Concept of Dowry

In Indian weddings, the term "dowry" (Dahej) refers to both the bride's freely offered gift, known as Kanyadaan, and the cost paid by the members of the wedding party to the bridegroom's network of contacts. An essential component of Hindu marriage rituals is kanyadanam. The Dana technique is included in the name "Kanya," which also refers to a daughter.

The money, goods, or estate which a woman gives to her husband during marriage is referred to as dower, or trousseau. It stands in contrast to the bride's parents as well as dower, which are assets created by the groom throughout the marriage, are valued at the bride's bridal worth. The same lifestyle may result from dower and bride rates. The custom of dower has a lengthy history and may have existed before written history.

At the bride-giving ritual (Kanyadana), the bride's family members give the groom's family members dowry (Dahej/Hunda). It might be monetary or in-kind. An essential ritual in Hindu weddings is kanyadana. Dana = gift, Kanya = daughter. The country's dower tool one may call marriages the "economic aspect of the wedding." Dowry has spread throughout the world. A woman acquires every piece of domestic equipment required to start her own family.

Due of its Vedic duration, dower gadgets were more and more popular in India. Gifts from families, brothers, and other family members were regarded as women's property throughout the Epic period and were called stridhan. The problem has extended to the southern & eastern areas of India in addition to a few states in the north.

All sectors, classes, groups of people, societies, and locales are impacted, which is the basic problem. Both the Muslim community and tribal communities with longstanding traditions of gender equality and egalitarianism support it. The general social acceptability of this unlawful activity has hampered attempts to address it in spite of strict laws and restrictions.

General Law (Bharatiya Nyaya Sanhita, 2023)

Bharatiya Nyaya Sanhita, 2023 mention about the Dowry Death under section 80¹

S. 80 Dowry death

When a woman dies within seven years of marriage due to burns, physical harm, or other causes other than those caused by normal circumstances, and it can be shown that she was subjected to abuse or prejudice by her husband and his family members for, or in connection with, a required dowry, this is known as "dowry death," and the husband or family member is considered to have caused the woman's death.

Explanation: For the intention of this sub-section, "dowry" has the same definition as in section 2 of the Dowry Prohibition Act of 1961.²

Whoever conducts the death by dowry shall be imprisoned for at least seven years and up to life.

74 of BNS using violence against women to violate their modesty³

Anyone who assaults a woman and uses illegal force against her with the intention of offending her modesty as well as knowing that they is likely to do so faces a minimum sentence of one year and a maximum sentence of five years in jail, as well as a fine.

Sections 85 and 86 of the Bharatiya Nyaya Sanhita (BNS)⁴

The Bharatiya Nyaya Sanhita (BNS) aims to integrate and modernize India's many legal statutes. The BNS's Sections 85 and 86 are noteworthy because they resemble Section 498A of IPC, which addresses cruelty committed by spouses or family members against married women. The legal protections provided to women are strengthened and continuity is ensured by this replication. Let's examine these sections in further detail, contrast them, and understand the implications.

Section 498A of the IPC was enacted in 1983 to protect married women against violence perpetrated by their husbands or the husband's family.

¹ Bharatiya Nyaya Sanhita, 2023 section 80

² Dowry Prohibition Act of 1961 section 2

³ Bharatiya Nyaya Sanhita, 2023 section 74

⁴ Bharatiya Nyaya Sanhita, 2023 section 85 & 86



Definition of Section 498A IPC

"498A spouse or a family member of a woman who abuses her anybody who, as a husband or family member of a woman, abuses a woman faces a maximum of three years in jail and a fine."⁵

The criteria of Section 498A of the IPC are replicated in Sections 85 and 86 of the BNS. This ensures that the new legal framework maintains the vital safeguards against misuse and intimidation.

Section 498-A of the Indian Penal Code provides a definition of cruelty that is open to interpretation and offers a straightforward opportunity. The burden of proof is with the side, and only certain situations are acceptable. Consider for bailable & cognizable cases to be consolidated with court consent in order to solve the issue of ineffectiveness. Those who misuse this space ought to be held accountable.

The 237th Law Commission Report⁶ suggested amending Section 320 CrPC to include sub-section (2A). The future condition makes sure that the wife is not mistreated after the offer to escalate the offense and that the offer is made voluntarily and without pressure. Furthermore, Section 498-A mandates that the Court actively consider compounding the violation.

The Dowry Prohibition ACT, 1961

The act was a key piece of legislation that stopped the dowry custom. Dowry was outlawed and punished by the law. The Act imposed severe punishments, including as fines and jail, on anyone found guilty of dowry-related offenses.

Features of the Act

- A. "Dowry" is defined as any property or valued security that is provided or promised to be provided, either directly or through an intermediary, under Section 2 of the Act of 1961. (a) By one spouse to the other spouse, or (b) By the parents of both spouses to either spouse, at any point before to or following the marriage, in connection with the marriage of the aforementioned parties.⁷
- B. Paying or receiving dowries during marriage is intended to be abolished under the Dowry Prohibition Act. The Act's Section 3 prohibits both giving and receiving dowries.⁸
- C. Violations of the Act carry severe penalties. Penalties for dowry violations include up to Rs. 15,000 including the dowry's value, whichever is higher, and a maximum sentence of five years in prison.
- D. The Act mandates that the newlyweds' legal guardian abide by the dowry ban. They have to inform the authorities in writing if there was no dowry given or obtained during the marriage.
- E. Anyone with information about dowries should notify a magistrate and police officer in accordance with Section 8 of the Act. Failure to do so is punishable by law.⁹
- F. Deaths caused by dowries are likewise covered by the Act. Section 304B, which deals with dowry fatalities, was added to the Indian Penal Code (IPC) in 1986. It is considered a dowry death if a lady passes away within seven years of marriage as a result of being harassed or assaulted in return for the dowry. Those implicated may be imprisoned for a minimum of seven years and a maximum of life,¹⁰ but now in section 85 of BNS.
- G. The Act offers protections for victims of dowry harassment. The statute gives judges the authority to issue injunctions and protection orders to stop victims from being assaulted or harassed in the future.
- H. The burden of proof rests with the accused in crimes involving dowries. Rather than the victim establishing the wrongdoing, the guilty must demonstrate their innocence.

Advantages of the ACT

1. **Legislative Framework:** The Act offers victims of dowry-related offenses a legal structure for pursuing justice.
2. **Awareness:** The Act's passage contributed to a greater understanding of the dowry system and its negative social impacts.

⁵ Indian Penal Code 1860 section 498A

⁶ 237 Law commission report: Compounding of (IPC) Offences (2011)

⁷ Dowry Prohibition Act 1961 section 2

⁸ Dowry Prohibition Act 1961 section 3

⁹ Dowry Prohibition Act 1961 section 8

¹⁰ Indian Penal Code 1860 section 304B



3. **Punitive Measures:** The imposition of fines for both dowries giving and receiving sends a clear message that the custom is unacceptable.

Limitations and Critiques

1. **Enforcement Issues:** One of the primary grievances about the Act is its lenient enforcement. Even with the legal limitations, dowry-related offenses are nevertheless rather common, mostly because to the lax enforcement of the law.
2. **Social Norms:** Dowry is difficult to eradicate through the legal system alone because it is so embedded in cultural norms and conventions. Cultural views and traditions around marriage & dowries usually take precedence over legal deterrents.
3. **Insufficient Support Systems:** Many victims of dowry harassment face challenges while attempting to access support systems and legal redress. The lack of adequate processes for reporting and handling dowry-related offenses further undermines the Act's efficacy.
4. **Changing Types of Dowry:** Dowry practices have evolved over time, taking on new forms like as "gift-giving" and "dowry disguised as presents," which may not be adequately covered by current regulations, even though the Act primarily deals with traditional sorts of dowries.
5. **Legal loopholes:** Due to legal loopholes, offenders can often escape punishment even in the face of the Dowry Prohibition Act. Delays in justice for victims might arise from protracted and challenging judicial proceedings. Furthermore, it is challenging to convict perpetrators since victims carry a disproportionate share of the burden of proof.
6. **Role of Law Regulation:** The effectiveness of the Dowry Prohibition Act depends on the commitment and competence of law enforcement agencies. However, the efficient execution of the law is regularly hampered by cases of law enforcement officers being corrupt, biased, or uninterested. Additionally, if society perceives dowry-related violence as common or trivial, victims could be discouraged from seeking help from the authorities.
7. **Holistic Solutions Are Needed:** Beyond taking legal action, a complete plan is needed to resolve the dowry issue. Initiatives to promote gender equality, offer women greater monetary and political power, as challenge patriarchal norms must all be part of any comprehensive strategy to abolish dowries. Community-based activities, educational initiatives, and awareness-raising campaigns can also significantly contribute in changing cultural norms and perspectives around dowries.

Judicial Interpretation

Numerous noteworthy cases have impacted the interpretation and implementation of the Dowry Prohibition Act in India. Here are a few notable examples:

One of the first cases in which the Supreme Court of India addressed the problem of dowry-related offenses was *State of Bihar v. Ramesh Singh*¹¹, which was heard in 1977. The court ruled that the Dowry Prohibition Act prohibited providing or receiving dowries and emphasized the need for strict enforcement of the law.

*State of Punjab v. Satvir Singh*¹²: In this landmark 2001 ruling, the Supreme Court clarified the legal definition of "dowry" under the Dowry Prohibition Act. According to the Act, the court determined that any valuable security or property given directly or indirectly at, before, or following the marriage as compensation for the union would be regarded as dowry.

*State of Maharashtra v. Appasaheb & Ors*¹³: Known as the "Bhanwari Devi Case," this case garnered a lot of attention due to its focus on the issue of dowry-related violence and the way the state responds to such acts. The case, which was heard by India's highest court in 2006, involved the gang rape of Bhanwari Devi, a social worker who was attempting to prevent a child marriage due to dowry demands. The court's ruling emphasized the importance of properly enforcing laws and the need for stringent steps to stop dowry-related violence.

*State of Bihar v. Arnes Kumar*¹⁴: In this historic 2014 ruling, the Supreme Court addressed the misuse of Section 498A of the IPC, addressing marital harassment, cruelty, and related crimes. The court issued guidelines to safeguard victims of dowry harassment and prevent the arbitrary arrest and incarceration of individuals under Section 498A.

¹¹ 1977) 4 SCC 39

¹² 001 SC Appeal (crl.) 1319

¹³ 2007 (Appeal (crl.) 1613

¹⁴ AIR 2014 SC 2756



Allegedly Murdered over Dowry¹⁵: In December 2021, a Hyderabad woman was allegedly killed by her spouse and in-laws due to demands for dowry.

According to the victim's relatives, she has been harassed and abused for dowry ever since she got married.

Delhi Dowry Death Case¹⁶: The family of a Delhi lady who died in November 2021 under suspicious circumstances says she was killed in return for a dowry. The woman claimed that in return for a dowry, her husband & in-laws had tormented and physically assaulted her.

Kerala Dowry assault Case¹⁷: In September 2021, a Keralan woman claimed her husband & in-laws of harassing and mistreating her throughout the dowry procedure. The woman said that she was physically assaulted and threatened because she refused to pay their demands for her dowry.

CONCLUSION

In conclusion, one notable piece of legislation that aims to address the pervasive societal issue of dowries in India is the Dowry Prohibition Act. Nevertheless, despite its noble objectives and the application of harsh punishments, the Act's effectiveness is still constrained by a number of problems.

According to Hindu mythology, marriages are created in heaven, but dowry lust is making more and more respectable people—such as husbands, sisters-in-law, and mothers-in-law—fear that the marriage would end. Dowry deaths, suicide, murder, and bride burning are all regrettable consequences of our society system and are signs of strange social issues. At some time in the previous few decades, India has witnessed the dark sins of the inheritance failing system in a more dramatic form in virtually every region of the United States, given that it is practiced by almost every sector of society. Almost every day, unproductive married woman are harassed, humiliated, overwhelmed, and forced to leave their spouses, commit suicide, and so on. Due to their parents' or their husbands' inability to provide the dowry requirements stipulated by law, many of them endure torture, cruel treatment, and even burns to death.

The traditional Hindu view that children are the "assets" of their parents is the source of this kind of treatment. Because of this, the bride of the groom is also considered a family asset, along with the son. The dowry she gives is used in compliance with the law as well as in the worst situations, to marry their daughter, leaving the bride completely at the mercy of the husband as well as his race. Many people believe that the dowry is more significant than the woman. Her capacity to bear children, which appears to have been the exclusive basis of marriage, is given a limited notion. She is becoming more and more recognized as a practical tool for making steady money and wealth.

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INTERPRETING MODESTY: A CRITICAL ANALYSIS OF JUDICIAL DISCOURSE ON WOMEN'S MODESTY

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"A man will treat a woman almost exactly the way he treats his own interior feminine. In fact, he hasn't the ability to see a woman, objectively speaking, until he has made some kind of peace with his interior woman." – Robert Johnson

ABSTRACT

This paper critically examines how Indian courts have interpreted modesty in relation to women's rights and autonomy. This study shows how the concept of modesty has been created, negotiated, and disputed in the legal system by thoroughly examining Indian court rulings, legislative acts, and constitutional guarantees. According to the study, women's autonomy and sense of agency are undermined by the legal system's view of modesty, which frequently upholds gender stereotypes and patriarchal standards. The study critically looks at how the court shapes the conversation around modesty and how it affects women's rights, especially when it comes to sexual abuse, harassment, and discrimination. The study makes use of a variety of theoretical stances, such as critical discourse analysis, postcolonial theory, and feminist legal theory. The study makes use of a variety of theoretical stances, such as critical discourse analysis, postcolonial theory, and feminist legal theory. The necessity for a more contextualized and nuanced definition of modesty that gives women's rights, experiences, and viewpoints priority is highlighted in the paper's conclusion. The study suggests a paradigm change in the way judges view modesty, one that acknowledges and values women's independence, self-determination, and dignity.

KEYWORDS: *modesty, women's rights, judicial interpretation, patriarchy, gender stereotypes, autonomy, agency.*

1. INTRODUCTION

In Indian society, the idea of modesty has long been a contentious and strongly embedded concept, especially when it comes to women's autonomy and rights. The language around modesty has been greatly influenced by the Indian court, which frequently interprets it in ways that support gender stereotypes and patriarchal standards. As a result, there is now a complicated and sometimes conflicting system of regulations and rulings that ostensibly safeguard women's modesty but really compromise their agency and autonomy.

The idea of modesty has been applied in a variety of contexts, including sexual assault, harassment, and discrimination. However, the judiciary's interpretation of modesty has often been criticized for being constrictive, patriarchal, and victim-blaming. Because of this, people no longer have faith or trust in the legal system, particularly women who have experienced harassment and assault.

The idea of modesty is ingrained in Indian culture and society, which places a strong emphasis on women's dignity, virginity, and purity. The concept of modesty is used to manage and govern women's bodies & lives and is frequently associated with how women dress, behave, and conduct themselves. As a result, women are now often examined and blamed for their alleged lack of modesty and held responsible for their own mistreatment.

These gender stereotypes and prejudices have been reinforced in large part by the Indian court. The judiciary has frequently upheld the idea that women's modesty is a valued quality that ought to be safeguarded and maintained through its rulings and interpretations. Because of this, women are now frequently denied equal opportunity and instead face increased marginalization and abuse.

With an emphasis on the consequences for women's freedoms and autonomy, this research study aims to critically analyze the Indian judiciary's view of modesty. In order to comprehend how the concept of modesty has been developed, negotiated, and fought in the legal realm, the study will examine a variety of court rulings, legislative acts, and constitutional guarantees.

The paper will also employ feminist legal theory, postcolonial theories, and critical discourse analysis to evaluate the judiciary's view of modesty, particularly its implications for women's rights and autonomy. Because the judiciary's concept of modesty is often based on



patriarchal assumptions and prejudices, the paper will argue that women are routinely denied fairness and equality. The study will also look at how women's rights organizations and activists have disputed and challenged the judiciary's definition of modesty. The study will contend that these disputes and challenges have caused the concept of modesty to be reexamined and have brought attention to the necessity for a more complex and contextual definition of modesty that places a higher priority on women's experiences, perspectives, and rights.

The overall goal of this research article is to advance knowledge of how Indian courts define modesty and how it affects women's autonomy and rights. The paper's goal is to highlight the requirement for a more complemented as well as nuanced knowledge of modesty by arguing that those women's experiences, opinions, and rights should be prioritized.

2. PROVISIONS RELATED TO 'OUTRAGING MODESTY OF A WOMAN' UNDER CRIMINAL LAW

The BNS addresses 'outraging the modesty of a lady' under sections 74 and 79. Outraging a woman's modesty is not a new offense, and the BNS has included nearly comparable rules from the Indian Penal Code (IPC), 1860 (the previous Indian criminal code).

Therefore, the relevant IPC provisions will be a helpful guide to understanding the crime of outraging modesty.

Sexual harassment comes in a variety of forms. Because of this, the IPC's provisions make rape, voyeurism, stalking, and people trafficking illegal, among other sexual harassment charges. The IPC's prohibitions on outraging a woman's modesty were frequently used as a catch-all in cases of harassing behavior against women that did not qualify as rape.

Sections 354 and 509 of the IPC dealt with insulting a woman's modesty. Assaulting or using coercive force against a woman with understanding or intent to violate her expectation of modesty was prohibited by Section 354.

Certain acts against women (such as making noises or remarks, displaying objects, or invading a woman's private) are punished under Section 509 if they are done with the aim to offend a woman's modesty.

Since the IPC did not define or explain the term "modesty," it was up to the judiciary to interpret the law in each particular case.

3. INTERPRETATION OF 'MODESTY' BY THE JUDICIARY

The Indian judiciary has a major influence on the conversation around modesty, especially when it comes to issues pertaining to women's autonomy and rights. This section highlights the main trends, patterns, and difficulties in the judicial evaluation of modesty in India. Modesty and its Judicial Interpretation Modesty has been construed differently by the Indian judiciary, which frequently relies on stereotypes and patriarchal presumptions. For instance, in cases involving sexual assault, the court has frequently ignored the survivor's independence and responsibility in favor of protecting women's modesty.

In the State of Punjab v Major Singh (1966), the SC was asked to decide at what age a woman achieved "modesty."

This case included a person who reportedly injured a seven-and-a-half-month-old girl's private areas and was prosecuted under Section 354 with outraging the infant's modesty.

According to Justice Gurdev Singh of the Punjab High Court, modesty is defined as "womanly propriety of conduct, scrupulous chastity of thought, speech, and behavior (in men or women), save or a feeling of shame going from instinctive aversion to unclean or coarse suggestions" in the 1933 edition of the Oxford Dictionary of English.

In other words, modesty was associated with traditional notions of what it meant to be a lady. Therefore, the high court judge concluded that the purpose of the modesty crime was to protect women from the immoral behavior of others by relating the concept of modesty to public morals and moral behavior.

The SC, however, created its own criteria in response to an appeal, concluding that Section 354 is applicable when an act done on or near a woman is clearly suggestive of sex based on human concepts.

The Supreme Court's Justice Ranadhir Singh Bachawat observed that a woman's modesty is fundamentally derived from her sex, and that she is born with this quality.



Interestingly, Amal Kumar Sarkar, who was then India's Chief Justice, dissentingly ruled that a female child could not be regarded as possessing womanly modesty. The Punjab High Court, the Supreme Court, and even the judges on the same Supreme Court bench in this case have different definitions of modesty, which highlights the variety of connotations that can be attached to the term "modesty" in the absence of a formal definition.

In its 2004 decision in *Raju Pandurang Mahale vs State of Maharashtra*, the SC cited Justice Bachawat's definition of modesty. The SC noted that a woman's modesty is a quality that results from her sex and determined that modesty in a woman's context is the reserve as well as sense of shame that arises from an innate dislike of coarse or unclean suggestions.

The Supreme Court established in the *Raju Pandurang Mahale* case that the standard to ascertain because a woman's modesty has been insulted is whether the offender's action might be interpreted as one that could shock a woman's sense of decency.

The Supreme Court additionally offered examples of actions that violate a women's modesty, such as dragging a woman and taking off her saree while requesting sex. In the 2007 case of *Ramkripal vs State of Madhya Pradesh*, the Supreme Court upheld this opinion.

By incorporating ambiguous and subjective concepts like "decency," the Supreme Court's test may have actually increased ambiguity.

The Bombay High Court used this standard in a recent ruling, concluding that stalking a lady does not violate her decency and, so, does not constitute an outrage against her modesty.

In reality, it is challenging to apply the test of infuriating a woman's modesty, frequently relying on the subjective evaluation of the court in a particular factual scenario. The Bombay High Court's ruling in the stalking case can be compared to its ruling in *Shrikrushna v State of Maharashtra*, 2021, where it was decided that just throwing a chit on a woman who expresses love for her and has "albeit extremely, purely written" poetic verses on it is enough to offend her modesty.

Therefore, even an action carried out with "pure" intentions could be considered disrespectful to a woman's modesty.

The question of whether telling a woman to "fuck off" was an insult to her modesty came up in the *Taisuf-ul Hassan against NCT of Delhi* case in 2022. The accuser's attorney contended that the phrase "fuck off" was not sexually suggestive because it means "to leave or go away" in the dictionary and is frequently used as an impolite manner to tell someone to depart.

Consequently, there was no desire to offend the woman's modesty. The accused's claim was rejected by the judge, who decided that the expression "fuck off" constituted a sexually offensive remark because it was a vulgar, humiliating, and abusive American slang term. As a result, the court found that there was a preliminary indication that a woman's modesty was offended.

4. DISMISSING A MODESTY-BASED APPROACH TO SEXUAL HARASSMENT

The problem is that the crime of "outraging the modesty of a woman" is currently used as a catch-all for sexually harassing behavior that does not fall under the specific scope of sexual offenses under Indian law.

To hold sexual harassment offenders accountable, such a residual clause is required. However, for the law to effectively provide victims of sexual harassment with remedy and for the courts to apply it consistently, it must be well defined.

The key issue before the Supreme Court in *State of Punjab vs. Major Singh (1966)* was *at what age a female attained 'modesty'*

Some contend that rather than depending on antiquated ideas of modesty, sexual assault should be understood in terms of women's bodily integrity and dignity.

Actually, the BNS's primary critique is that it perpetuates colonial ideologies. This includes keeping the BNS's definition of sexual harassment, which is based on a patriarchal view of sexual violence, 'modesty'. The BNS does not define modesty, just like its predecessor did.

We must shift from an honor-chastity-modesty worldview to one that views sexual violence as an invasion of sexual autonomy in order to comprehend sexual harassment.



In this context, the recommendations of the Justice Verma Committee—which was formed to advise amendments to the IPC in the wake of the 2012 Nirbhaya gang rape—are particularly instructive.

The committee noted that under South African law, sexual assault is a common law offense that replaces indecent assault. The committee suggested that Section 354 be reenacted as a sexual assault offense to cover all non-consensual, non-penetrative sexual touching as well as using words, actions, or gestures toward or in the presence of another individual that result in an unwanted sexual threat or an unwanted advance.

“Some contend that rather than depending on antiquated ideas of modesty, sexual assault should be understood in terms of women's bodily integrity and dignity.”

A definition like that would be sufficiently inclusive to include the different types of sexual harassment that do not qualify as rape. Unfortunately, IPC revisions did not ultimately incorporate the committee's recommendations.

Public decent and morality are vague and subjective concepts that are connected to our current notion of the offense of outraging modesty. Rather than perpetuating colonial ideas of crimes against women, courts should apply the BNS 2023 by interpreting the modesty provisions in accordance with the Justice Verma Committee's recommendations.

The criminal case against a petitioner who was accused of insulting a woman's modesty was recently dismissed by the Calcutta High Court. The court decided that the ultimate criteria to assess whether a lady's modesty has been offended is if that person's action can shock her sense of decency. In this case, following a dispute between two rival political parties, the petitioner was accused of disparaging female modesty. However, the court found that the petitioner was not sufficiently substantiated and that the charges were baseless. The court decided that allowing the lawsuit to continue would be an abuse of the legal system. The decision highlights how important it is to carefully consider the evidence when a female's modesty is being criticized.

According to the Kerala High Court, in case of vijayan v. State of Kerala, 2021 a woman's modesty might be outraged under Section 354 of the IPC if the perpetrator's actions are deemed to have the potential to shock a woman's sense of decency. In this instance, the upper primary school's Parent Teachers Association (PTA) president was charged with using profanity and insulting the modesty.

- **Mamta Tyagi v. State of Delhi & Anr (2022)**

This decision addressed outrage at a woman's modesty and the use of improper force. The court determined that the accused's actions were unlawful, including using unlawful force to insult the victim's modesty.

- **Sunil N S v. State of Kerala (2024)**

The accused in this case, who was accused of insulting a woman's modesty, had his bail application denied by the Kerala High Court. The accused's conduct was deemed significant by the court, and granting bail would compromise the victim's dignity.

- **In the case of Major Singh (1967)**

Despite being older, this ruling is still applicable today. The court ruled that whether an act can shock a woman's sense of decency is the final test for assessing whether it amounts to outraging her modesty.

4. CONCLUSION

The judicial interpretation shows the courts' dedication to enforcing the law and providing victims with justice, while also highlighting the significance of preserving women's modesty and dignity. With significant ramifications for women's freedoms and autonomy, the legal comprehension of modesty in India has proven a complicated and contentious topic. The way the judiciary has created, negotiated, and challenged the concept of modesty has been highlighted in this research paper's critical analysis of the judicial discourse on the subject. According to the analysis, the judiciary frequently bases its understanding of modesty on patriarchal presumptions and stereotypes, which support the marginalization and objectification of women. Women's autonomy and agency have frequently been restricted due to the judiciary's emphasis on protecting women's modesty, especially in cases involving sexual violence and harassment.

Nonetheless, the study has also brought to light the ways in which women's rights organizations and activists have disputed and questioned the judiciary's definition of modesty. The decisions analyzed in this article demonstrate that the court system is becoming increasingly conscious of the need to protect women's autonomy and agency and to hold those accountable for acts of sexual misconduct and assault. Notwithstanding these positive developments, much more work has to be done to ensure that the judiciary's interpretation of modesty is consistent with the principles of gender equality and justice. The judiciary must continue to recognize and respect women's autonomy and agency in as well as holding individuals accountable for sexual abuse and harassment.



Furthermore, a more contextualized and nuanced definition of modesty is required, one that considers the many viewpoints and experiences of women. The judge must be mindful of the power relationships that shape modesty and take care to avoid reinforcing stereotypes and patriarchal standards. In conclusion, the Indian judiciary's view of modesty is a contentious and complicated topic that has a significant impact on women's autonomy and rights. Even while recent developments have been positive, much more work must be done to ensure that the judiciary's interpretation of modesty is consistent with the principles of gender equality and justice.

Recommendations

The following suggestions are offered in light of the study in this paper:

1. The judiciary must recognize and respect women's independence and agency while holding individuals accountable for sexual assault and harassment.
2. A more contextualized and nuanced view of modesty that considers the various experiences and viewpoints of women must be adopted by the judiciary.
3. The legal system must be mindful of the power relationships that shape modesty and take care to avoid reinforcing stereotypes and patriarchal standards.
4. The government must address the systematic and institutional barriers that prevent women from accessing justice, such as an absence of women in legal fields and courts.

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EVOLVING PARADIGMS IN CRIMINAL LAW: A CRITICAL STUDY OF INDIA'S LEGAL REFORMS

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ABSTRACT

The evolution of criminal laws reflects societal shifts and the need to adapt to contemporary challenges. In India, the introduction of the Bharatiya Nyaya Sanhita (BNS), 2023, alongside the Bharatiya Nagarik Suraksha Sanhita (BNSS), 2023, and the Bharatiya Sakshya Adhiniyam (BSA), 2023, marks a significant move away from colonial-era laws, particularly the Indian Penal Code (IPC), 1860. The new criminal laws are critically examined in this essay, with an emphasis on victim-centric justice and the reforms meant to address contemporary crimes. With an emphasis on proportionality in sentencing, it examines the effects of removing antiquated clauses like sedition and adding provisions for cybercrimes. The socio-legal impact and implementation challenges are also examined in the analysis. An analysis of the reforms' wider significance in creating a more inclusive and equitable criminal justice system in India is included in the article's conclusion.

KEYWORDS : *Bharatiya Nyaya Sanhita (BNS), Indian Penal Code (IPC), Criminal Law Reforms, Cybercrimes, Victim-Centric Justice*

1. INTRODUCTION

A society's capacity to adjust to shifting needs, values, and difficulties is reflected in the development of criminal laws. For more than 160 years, the Indian Penal Code (IPC), 1860, served as the cornerstone of the nation's criminal justice system. It was draughted during British colonial rule with the intention of standardizing the way justice was administered. However, it became more and more incompatible with the goals of an independent and forward-thinking country due to its colonial origins and incapacity to handle contemporary issues. In order to modernize the criminal justice system, the Indian government recognized these shortcomings and introduced the Bharatiya Nyaya Sanhita (BNS), 2023, along with related reforms. In its day, the IPC was revolutionary since it established a uniform framework for classifying offences and establishing penalties. But rather than pursuing justice, its main goal was to uphold colonial authority. During the freedom struggle, dissent was suppressed by laws like Section 124A of IPC on sedition, which targeted leaders like Mahatma Gandhi and Bal Gangadhar Tilak.¹ Although some changes were made after independence, the colonial mentality ingrained in the IPC remained. Rather than meeting the demands of a free and democratic society, many provisions—such as those pertaining to sedition and transportation for life—reflected outmoded priorities. Furthermore, the IPC was unable to keep up with new types of crimes. The 19th century was not prepared for the new problems brought about by globalization and technological advancements, such as identity theft, financial fraud, and cybercrimes. Victims were left vulnerable by this legal void, and law enforcement was ill-prepared to handle contemporary threats. Similarly, the IPC's gender-specific definitions of crimes, such as rape, did not take into account changing views of justice and gender and excluded particular victim categories. Delays in the administration of justice were also made worse by the procedural framework that accompanied the IPC. Prolonged backlogs of cases were caused by onerous procedures under the Code of Criminal Procedure (Cr.P.C.). The IPC's colonial-era English language further made it difficult for laypeople to comprehend the law and their rights. The public's disenchantment with the legal system was caused by these systemic inefficiencies, which also highlighted the necessity of extensive reforms. The introduction of the BNS is a transformative step towards addressing these challenges. It aims to decolonize the legal system, aligning it with Indian values and contemporary realities. By repealing Section 124A of IPC, the BNS emphasizes India's commitment to free speech and democracy while introducing stricter provisions for crimes against the state. The BNS is a transformative step towards addressing these challenges, as it aims to decolonize the legal system and align it with Indian values and contemporary realities. The BNS takes significant strides in addressing modern crimes, such as cyber offences, financial fraud, and terrorism. However, implementing the BNS presents challenges. Effective training for law enforcement, legal practitioners, and judges is critical to ensuring that the new provisions are applied consistently. Public awareness campaigns are also necessary to inform citizens about their rights and responsibilities under the BNS. Furthermore, aligning the BNS with existing legal frameworks is required to avoid conflicts and ensure a smooth transition. The BNS represents a new era in

¹ K.D. Gaur, *A Textbook on the Indian Penal Code*, 6th ed. (Delhi: Universal Law Publishing, 2018), at 5-7.



Indian criminal justice. By addressing the IPC's limitations and responding to modern realities, it reflects the goals of a progressive and inclusive democracy. Its success will be dependent on effective implementation, institutional support, and the collaborative efforts of all stakeholders. This evolution of criminal laws demonstrates India's commitment to justice, equity, and progress, laying the groundwork for a more equitable and efficient legal system.

2. HISTORICAL CONTEXT AND RATIONALE FOR REFORM

The evolution of India's criminal laws reflects the country's sociopolitical history, from colonial rule to independence. The Indian Penal Code (IPC), draughted in 1860, was one of the first attempts to standardize criminal laws throughout the diverse Indian subcontinent. While progressive for its time, the IPC primarily served the British colonial regime's interests, emphasizing law and order over substantive justice. This intent was evident in provisions such as Section 124A of IPC on sedition, which was used to suppress dissent and restrict freedoms, specifically targeting leaders of India's independence movement. Following 1947, independent India retained the IPC, with modifications to meet the needs of a sovereign nation. However, many provisions remained out of date, reflecting a colonial legacy that prioritized control over equity. Punishments like "transportation for life" and archaic language further highlighted the anachronistic² nature of these laws. Over time, India's changing socioeconomic landscape exposed the IPC's shortcomings in addressing current challenges. Emerging crimes such as cybercrime, financial fraud, and terrorism, combined with technological advancements, have revealed significant gaps in the current legal framework. Procedural inefficiencies exacerbated the problem. The Code of Criminal Procedure (CrPC), which accompanied the IPC, caused excessive delays in case adjudication, resulting in significant court backlogs. This denied victims timely justice and weakened public trust in the system. Furthermore, the IPC's complex language made it inaccessible to the average citizen, separating the legal system from those it was designed to protect. Recognizing these limitations, the Indian government implemented comprehensive legal reforms, including the Bharatiya Nyaya Sanhita (BNS) 2023, which will replace the IPC. These reforms seek to decolonize India's legal system by addressing colonial vestiges and aligning it with current socio-cultural and constitutional values. A major highlight of the reforms is the repeal of contentious provisions such as Section 124A of IPC, which represents a commitment to democratic freedoms and constitutional rights. The new laws also prioritize modernization, including provisions to combat emerging crimes like cyberstalking, digital fraud, and organised crime. These measures reflect a better understanding of the changing nature of criminal activity in a globalised, technologically driven world. The emphasis on victim-centric justice represents a significant shift in reforms. Provisions for victim compensation, rehabilitation, and support demonstrate a shift from punitive justice to a more restorative approach. This focus is consistent with global trends in criminal jurisprudence, emphasizing healing and restitution for those affected by crime. Efficiency in justice delivery is another pillar of the reforms. The Bharatiya Nagarik Suraksha Sanhita (BNSS), which replaces the CrPC, aims to streamline procedures and reduce delays. Measures such as simplified legal language, technological integration into investigations, and increased police accountability are intended to make the justice system more accessible and transparent. Similarly, the Bharatiya Sakshya Adhiniyam (BSA) modernizes evidentiary principles, particularly those governing digital and electronic evidence, ensuring that the legal framework remains relevant in the digital age. While these reforms are ambitious, their success is dependent on effective implementation. Adequate training for law enforcement, the judiciary, and legal practitioners is critical for a successful transition. Public awareness campaigns are also required to inform citizens about their rights and responsibilities under the new legislation. Addressing challenges like judicial backlog and infrastructural deficiencies will be critical in realising the full potential of these reforms.

3. SALIENT ATTRIBUTES OF THE REVAMPED CRIMINAL LEGISLATIONS

The introduction of Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA) signifies a transformative shift in India's criminal justice framework. These laws replace the colonial-era Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), and Indian Evidence Act, addressing their limitations while aligning with contemporary needs. The reforms prioritize modernization, inclusivity, procedural efficiency, and addressing emerging crimes, reflecting a progressive vision of justice. One distinguishing feature of these laws is their emphasis on decolonization. The IPC, while revolutionary at the time, was based on colonial control rather than justice. By replacing these statutes, the new framework reflects Indian constitutional values and societal realities. The simplification of legal language and the inclusion of modern provisions make these laws more accessible and relevant today. To address modern crimes such as cybercrime, terrorism, and organised crime, the BNS and BNSS contain specific provisions with clear definitions and penalties. For example, cyberstalking, identity theft, and digital fraud are now explicitly addressed, ensuring that the legal system keeps up with technological advances. Another watershed moment in justice reform is the emphasis on victimhood. Provisions for victim rehabilitation, compensation, and support reflect a shift towards restorative justice, which prioritizes healing and accountability. The BNSS streamlines procedural efficiency by reducing delays and increasing accountability. It promotes

² Anachronistic means, "existing out of its time in history"



the use of technology in investigations and trials, thereby increasing transparency and accessibility. Similarly, the BSA updates evidentiary principles by acknowledging the admissibility of digital and electronic evidence. These changes align India's legal framework with global standards, ensuring its relevance in a technologically driven world. The repeal of outdated provisions such as the sedition law and colonial penalties demonstrates the reforms' progressive intent. While punitive measures remain in place, the emphasis on rehabilitation, such as educational and vocational programs for offenders, demonstrates a more balanced approach to justice. The successful implementation of these laws is critical. Training for law enforcement, the judiciary, and legal practitioners, as well as public awareness campaigns, will help ensure a successful transition. Addressing issues such as judicial backlog and infrastructure deficiencies will be critical to their success.

4. CRITICAL ANALYSIS OF NEW CRIMINAL LAWS

The new criminal laws make several notable changes. The BNS replaces the IPC, emphasizing modernization and a victim-centered approach. Similarly, the BNSS, which will replace the CrPC, emphasizes procedural efficiency and seeks to speed up justice delivery by addressing delays and implementing simplified processes. The BSA, which replaces the Evidence Act, incorporates technological advancements and modern evidentiary principles to address new challenges in criminal trials. The reforms include the repeal of archaic provisions such as Section 124A of IPC, as well as the implementation of comprehensive measures to combat cybercrime, terrorism, and organised crime. The emphasis on restorative justice, victim compensation, and rehabilitation reflects a shift away from punitive to holistic justice.³

4.1 Strengths of the New Criminal Laws

4.1.1. Decolonization of Legal Framework

The decolonization of India's legal framework is one of the most significant and transformative aspects of the newly enacted criminal laws. These changes represent a significant departure from the colonial legacy of the Indian Penal Code (IPC), Code of Criminal Procedure (CrPC), and Indian Evidence Act, which were originally designed to serve the interests of the British Empire. While these statutes had historical relevance, they were primarily designed to exert control over the Indian populace, prioritizing punitive measures while ignoring India's cultural and societal diversity. Their legacy frequently clashed with the values and goals of a modern, democratic society. By replacing these laws with the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA), India has undertaken a bold step toward reclaiming its legal identity. This decolonization effort not only modernizes the framework, but also ensures that it is consistent with indigenous principles and current challenges. The new laws prioritize justice, inclusivity, and equality, reflecting the changing needs of Indian society. They want to create a judiciary that reflects India's cultural heritage while maintaining its democratic ideals. This shift represents not only a legal reform, but also a broader transformation, resulting in a system that empowers citizens and promotes social progress. This transition is more than just symbolic; it reflects an effort to make laws more relevant to today's socio-cultural and economic realities.⁴

4.1.2. Modernization and Inclusivity

The Bharatiya Nyaya Sanhita (BNS) reflects a careful balance between modernization and traditional approaches, particularly in its treatment of offenses like rape. While the law retains rape as a gender-specific crime against women, it introduces reforms that aim to foster inclusivity and provide broader protection to various segments of society. This inclusivity is evident in provisions addressing crimes against vulnerable groups such as children, the elderly, and marginalized communities, thereby expanding legal safeguards and reflecting the evolving needs of a diverse society. These efforts underscore a commitment to justice that resonates with contemporary social realities. Modernization is a hallmark of the Bharatiya Nagarik Suraksha Sanhita (BNSS), which introduces innovative mechanisms to address the growing menace of cybercrimes like phishing, identity theft, cyberstalking, and digital fraud. Such offenses, largely overlooked by older laws, are now addressed with specific provisions, ensuring the legal framework keeps pace with technological advancements. The inclusion of measures governing the admissibility of electronic evidence and digitized court procedures improves the efficiency and transparency of justice delivery. Although the lack of gender-neutral provisions in some areas is still debated, the overall emphasis on modernization and inclusivity reflects a progressive shift. These reforms are a significant step towards bringing India's criminal justice system in line with the complexities of modern society and global standards, emphasizing the importance of adapting laws to meet changing social challenges.

³ Ministry of Home Affairs, *New Criminal Laws*, available at <https://www.mha.gov.in/en/commoncontent/new-criminal-laws> (last visited on Dec. 14, 2024).

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4.1.3. Victim-Centric Approach

The incorporation of a victim-centric approach into the new criminal laws reflects a progressive shift in India's criminal justice system. By emphasizing victims' rights and rehabilitation, these provisions aim to address one of the most overlooked aspects of the justice system: ensuring that those directly affected by crimes receive adequate support and restitution. The inclusion of measures for victim compensation, psychological rehabilitation, and financial assistance is a positive step towards making the justice system more compassionate and inclusive. These initiatives not only recognize victims' suffering, but also seek to restore their dignity and sense of safety. Furthermore, this approach is consistent with global restorative justice practices that prioritize repairing the harm caused by criminal acts over punishing the offender. The reforms promote a balanced justice system that looks for holistic solutions rather than just retribution. Such measures ensure that victims feel heard, supported, and adequately compensated, resulting in a framework in which justice meets both individual and societal needs. This victim-centric perspective has the potential to increase trust in the legal system by demonstrating that the state prioritizes the well-being of those who bear the brunt of the consequences of criminal acts.

4.1.4. Streamlined Procedures

The Bharatiya Nagarik Suraksha Sanhita (BNSS) emphasizes the importance of streamlining procedures in the criminal justice system to address long-standing inefficiencies and delays. One of its key initiatives is to simplify complex legal language, making laws easier to understand for both citizens and stakeholders. By reducing ambiguities in legal provisions, the BNSS hopes to facilitate faster interpretation and application of the law, resulting in faster case resolution. Furthermore, the reforms emphasize the need for increased police accountability, recognizing law enforcement's critical role in the justice delivery process. Measures such as increased oversight and transparency in police investigations are intended to restore public trust in the system and ensure fair treatment for all parties involved. Furthermore, the BNSS emphasizes the role of technology in investigations and judicial processes. The framework aims to reduce manual errors, speed up case processing, and improve overall accessibility by incorporating tools like digital documentation, electronic filing systems, and evidence management software. These technological advancements are expected to speed up trials and investigations, ensuring that justice is not only delivered, but also perceived as efficient and equitable. These procedural reforms aim to make the criminal justice system more responsive, efficient, and citizen-friendly, addressing long-standing inefficiencies.⁵

4.1.5. Addressing Modern Crimes

The new criminal laws, particularly the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA), include provisions aimed at addressing the complexities of modern criminal activities. Crimes such as cybercrime, organised crime, and terrorism have grown in sophistication and prevalence as technology has advanced, posing significant threats to security and public order. Recognizing these challenges, including specific legal mechanisms to combat such crimes is an important step towards modernizing India's criminal justice system. Hacking, identity theft, data breaches, and online fraud are examples of cyber offences that require a nuanced legal framework as well as technical expertise to be resolved effectively. Similarly, organised crime, with its complex networks and transnational operations, necessitates strict laws aimed at dismantling such systems. The provisions addressing terrorism emphasize the critical need for legal mechanisms to counter activities that endanger national security. By incorporating these measures, the legal framework becomes more aligned with current realities, ensuring that it is prepared to deal with the changing nature of criminal behaviour. These steps show foresight in developing a system that is both reactive and proactive in addressing threats posed by technological and societal changes. Finally, this adaptation demonstrates a commitment to maintaining public trust and justice in a rapidly changing world.⁶

4.1.6. Emphasis on Digital Evidence

The Bharatiya Sakshya Adhiniyam (BSA) makes significant advances in the management and admissibility of digital and electronic evidence, reflecting the changing nature of criminal activity and investigation in the modern era. With the widespread use of technology in both personal and professional settings, digital evidence has become an important part of legal proceedings. The inclusion of specific provisions for dealing with such evidence demonstrates recognition of its growing importance in the criminal justice system. The BSA ensures compliance with current evidentiary standards by formally recognizing digital footprints—such as emails, text messages, social media activity, and metadata—as admissible evidence. This step is critical in combating increasingly technologically based crimes such as cybercrime, financial fraud, and identity theft. Furthermore, the law promotes the use of advanced investigative tools and forensic methods, increasing the efficiency and accuracy of criminal investigations. The emphasis on digital evidence not only strengthens the prosecution's case, but also assists the judiciary in making sound decisions. However, this progressive measure requires strong

⁵ S. K. Gupta, *Reforms in Indian Criminal Justice System: A Critical Analysis* (New Delhi: Oxford University Press, 2023), at 50-55.

⁶ P. Kumar, *Cyber Crimes and Legal Framework in India* (Mumbai: Legal Horizons, 2022), at 77-80.



frameworks for data integrity, privacy protection, and misuse prevention. It also emphasizes the importance of providing adequate training to law enforcement and legal professionals in order to effectively handle and present digital evidence in court.

4.2 Criticisms and Challenges

Despite the progressive elements of the new criminal laws, there are certain areas that warrant critical examination:

4.2.1. Ambiguity in Certain Provisions

One of the significant concerns with the new criminal laws, particularly the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA), is the ambiguity present in certain provisions. Despite the noble goal of modernizing and decolonizing the Indian criminal justice system, some provisions are draughted in a way that allows for subjective interpretation. This lack of clarity may result in inconsistencies in their application and provide opportunities for abuse. A prime example is the repeal of the colonial-era sedition law, which many see as a positive step towards ensuring free speech. However, introducing similar provisions using different terminology may dilute the reform's intended effect. The new provisions, which use broad language, may still be used to suppress dissent and individuals or groups who challenge the status quo. This raises serious concerns about whether the reforms will achieve their primary goal of promoting democratic values and safeguarding fundamental rights, or if they will unintentionally empower authorities to suppress free expression. As a result, the draughting of these laws necessitates careful scrutiny to ensure that they serve their intended purpose without creating loopholes that could be abused.

4.2.2. Implementation Hurdles

The shift from the old legal framework to the newly introduced criminal laws, namely the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA), presents considerable implementation challenges. One of the most significant obstacles is the need for extensive training and capacity building among all stakeholders, including law enforcement, the judiciary, and legal professionals. These new laws are comprehensive and complex, necessitating that law enforcement and judicial officers understand and effectively apply their provisions. Without proper training, the intended reforms may be misinterpreted or poorly implemented, undermining their effectiveness. Furthermore, the implementation of the new laws necessitates significant human and financial resources to ensure their success. The lack of adequate infrastructure, which includes insufficient judicial staff and outdated police systems, may impede the smooth implementation of these reforms. Furthermore, a lack of public awareness and familiarity with the changes may delay the desired outcomes. As such, while the reforms are necessary, their success depends on the careful and systematic allocation of resources, as well as the establishment of robust mechanisms for training, monitoring, and continuous improvement.

4.2.3. Judicial Backlog and Procedural Delays

Despite the implementation of reforms such as the Bharatiya Nagarik Suraksha Sanhita (BNSS), judicial backlogs and procedural delays remain a major concern in the Indian legal system. The new laws aim to streamline certain processes, but the structural issues that cause delays are largely unaddressed. One of the primary causes of judicial backlog is an overburdened judiciary. Courts across the country are overburdened with pending cases, significantly slowing the delivery of justice. This backlog is exacerbated by insufficient judicial infrastructure, which includes out-of-date courtrooms, inadequate technology, and limited access to legal resources. Another critical issue is a judge shortage, which exacerbates delays in case hearings and resolutions. Despite the implementation of reforms such as the Bharatiya Nagarik Suraksha Sanhita (BNSS), judicial backlogs and procedural delays remain a major concern in the Indian legal system. The new laws aim to streamline certain processes, but the structural issues that cause delays are largely unaddressed. One of the primary causes of judicial backlog is an overburdened judiciary. Courts across the country are overburdened with pending cases, significantly slowing the delivery of justice. This backlog is exacerbated by insufficient judicial infrastructure, which includes out-of-date courtrooms, inadequate technology, and limited access to legal resources. Another critical issue is a judge shortage, which exacerbates delays in case hearings and resolutions.

4.2.4. Impact on Civil Liberties

The potential impact of the new criminal laws on civil liberties has been a point of contention among legal experts and civil society. Critics highlight that some provisions within the Bharatiya Nyaya Sanhita (BNS) and Bharatiya Nagarik Suraksha Sanhita (BNSS) may pose risks to individual rights and freedoms. One primary concern is the expanded powers granted to law enforcement agencies. Despite the implementation of reforms such as the Bharatiya Nagarik Suraksha Sanhita (BNSS), judicial backlogs and procedural delays remain a major concern in the Indian legal system. The new laws aim to streamline certain processes, but the structural issues that cause delays are largely unaddressed. One of the primary causes of judicial backlog is an overburdened judiciary. Courts across the country are overburdened with pending cases, significantly slowing the delivery of justice. This backlog is exacerbated by insufficient judicial infrastructure, which includes out-of-date courtrooms, inadequate technology, and limited access to legal resources. Another critical



issue is a judge shortage, which exacerbates delays in case hearings and resolutions. Only by addressing these concerns can the BNS and BNSS uphold their commitment to justice while preserving the fundamental rights enshrined in the Constitution.

4.2.5. Limited Public Awareness

Although the goal of these powers is to improve enforcement and increase investigation efficiency, if they are not sufficiently controlled, they may also be abused. In the absence of strong safeguards, there may be arbitrary decisions, abuses of power, and due process violations. The harmony between preserving civil liberties and enabling law enforcement is sensitive. These increased powers could disproportionately affect vulnerable groups, resulting in invasive surveillance or unjustified detentions, in the absence of clear guidelines and accountability procedures.⁷ The problem is made worse by some clauses' ambiguity, which could lead to arbitrary and wide interpretations. Strict oversight procedures must be put in place, law enforcement operations must be made more transparent, and actions taken under these provisions must be subject to judicial review in order to reduce these risks. To close this gap and guarantee that the reforms are implemented across the country, legal professionals, the media, civil society, and local government must work together. The intended progressive changes of the new criminal laws can only be fully realized by citizens through informed participation.

4.2.6. Overemphasis on Punitive Measures

The new criminal laws' seeming overemphasis on punitive measures is one of the most prominent criticisms levelled at them. Even though the implementation of restorative justice procedures and victim compensation is a positive step, some of these laws' provisions still strongly favor punishment over rehabilitation. The key to criminal justice is striking a balance between reformation and deterrence. However, in certain areas of the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA), this balance seems to be off. Stronger punishments for some crimes, for example, might discourage prospective criminals in the short run, but they might not deal with the underlying issues that lead to criminal activity or make it easier for offenders to reintegrate into society. Recidivism has been shown to be decreased by reformatory justice, which emphasizes education, rehabilitation, and social reintegration. Regretfully, the new laws run the risk of preserving a system in which punitive measures predominate, possibly ignoring chances for real social change. Because they are frequently more disadvantaged when navigating the legal system, marginalized groups may be disproportionately impacted by this strategy. Consequently, even though the goal of these reforms is admirable, it is imperative that they change to give equal weight to deterrence, reformation, and restoration in a fair and compassionate justice system.

5. CONCLUSION

A revolutionary change in India's criminal justice system was brought about by the introduction of the Bharatiya Nyaya Sanhita (BNS), Bharatiya Nagarik Suraksha Sanhita (BNSS), and Bharatiya Sakshya Adhiniyam (BSA). With a contemporary framework designed to address long-standing shortcomings, these new laws replace the Indian Penal Code (IPC), Criminal Procedure Code (CrPC), and Indian Evidence Act from the colonial era. These reforms, which have their roots in modernization, inclusivity, and victim-centric justice, aim to move India's legal system away from the colonial legacies that have shaped it for more than 160 years and towards the needs of modern society. The BNS, BNSS, and BSA seek to ensure timely and equitable justice by concentrating on new issues like cybercrimes, gender neutrality in offences, and victim compensation mechanisms. This reflects the goals of a progressive and democratic society. Because it reflects an attempt to decolonize India's legal system and modify it to conform to indigenous values and democratic ideals, the transition from the IPC to the BNS is especially noteworthy. In order to expedite the administration of justice, the BNSS and BSA, respectively, concentrate on evidentiary rules and procedural reforms. When combined, these laws create a more responsive and unified legal framework that emphasizes restorative justice principles while addressing the complexity of contemporary crimes. However, the successful execution of these reforms will be crucial to their success. To guarantee a smooth transition to the new framework, significant investments in training the judiciary, legal professionals, and law enforcement officers will be required. In order to align current laws with these new provisions and prevent inconsistencies, the government must also conduct a thorough review of current legislation. Campaigns to raise public awareness of the new legal system's rights and obligations are equally important for building confidence and encouraging involvement in the legal system. To maximize the impact of these reforms, it will also be essential to address systemic problems like police accountability, judicial backlogs, and infrastructure deficiencies. Maintaining a balanced approach to the administration of justice is also necessary. Although the emphasis on victim-centric justice is admirable, caution must be exercised to guarantee that the rights of the accused and the fair trial principles are upheld. To handle unforeseen difficulties and make sure that these laws adjust to the changing needs of society, ongoing observation, assessment, and improvement will be required. In order to find and close gaps and keep these laws current and functional, cooperation between legislators, legal experts, and civil society will be crucial.

⁷ Dissemination means, "the act of spreading news, information, ideas, etc. to a lot of people"



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