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# **SPECIFIC FEATURES OF THE DEVELOPMENT OF CONSERVATIVE IDEAS IN THE UNITED STATES**

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## **ABSTRACT**

*This article analyzes the general content of the political ideology of conservatism, conservative ideologies in the United States, their peculiarities and features of development. Attention is also paid to the impact of conservatism on US domestic and foreign policy and its role in the modern system of international relations.*

**KEYWORDS:** *conservatism, the political ideology of conservatism, U.S., domestic and foreign policy, ideological evolution, ideology of neoconservatism.*

## **INTRODUCTION**

Socio-political and ideological processes in the late twentieth and early twenty-first centuries, in particular, the end of the bipolar world order, the trend towards multipolarity, the acceleration of trade, economic and integration processes have led to radical changes in the ideological landscape. By this time, concerns about the negative impact of certain political ideologies were growing.

This is certainly not in vain. Because ideas and ideologies that have the power to influence the whole world, in terms of their power and scale, often play a leading role in the ideological landscape of the world. Ideological processes specific to a particular region or individual state also play a role in this. In this regard, special attention should be paid to the political and ideological doctrines of the world's leading countries in terms of economic potential and political influence. In many regions and territories of the world, the influence of these countries is clearly felt and is clearly reflected in the ideological landscape of today's world.

In this regard, in the context of changing global impact, there is a comparison of different political concepts, doctrines that represent the content of international relations and foreign policy of states, theories that have not been sufficiently studied by one or another national, scientific schools as a complex scientific problem. Until the last decades of

the twentieth century, in the system of world politics and international relations, ideological currents such as realism, Marxism, liberalism, scientific schools and forms of worldview have been in the spotlight of the scientific community.

## **MATERIALS AND METHODS**

By the post-1990s, interest in the ideology of conservatism had increased. That is, the role of conservative ideas in the new world order is growing, and the influence of certain states in the development of domestic and foreign policy strategies is growing. In particular, one of the largest ideological currents that has its place in the ideological landscape of the modern world is conservatism. In the lexical sense, "conservatism" (latin *conservatisme*) means "preservation", "protection". Conservatism emerged in the eighteenth century as an ideology that secular and ecclesiastical feudal lords descended from the stage of history, representing the interests of various social strata who feared the future, condemned liberalism, and advanced the idea of the inviolability of divinely established orders. Its basic rules were laid by the English thinker and politician E. Burke (1729-1797), the French public figure J. de Mestr (1753-1821) and L. de Bonald (1754-1840). Underlying these rules is the idea of preserving traditional values associated with the order of things that are naturally decided, family, nation, religion,



class division. That is why conservatives advocate the priority of succession over innovation in social development. In their opinion, political principles should be adapted to customs, national traditions, established socio-economic and political institutions. There is no doubt in them that the hierarchical social structure is established from above, and therefore it cannot be arbitrarily changed by man. According to traditional views, the stratum of people who suffered from the unrest in society during the great French Revolution were regarded as conservatives. Conservatism is a system of views, cognitions, and political-ideological systems of attitudes toward the world around us. But it is not always associated with specific political parties such as liberalism, social democracy, marxism. Conservatism encompasses a variety of sometimes conflicting ideas, concepts, doctrines, and traditions[2].

As a rule, the starting point of modern conservatism is the publication in 1790 of E. Burke's famous essay "Reflections on the Revolution in France"[11]. It is clear from this that conservatism as a modern political ideology dates back to the time of the great French Revolution, and that historical diversity has the character of diversity. But their main views are close to each other.

The term "conservatism" was first used and popularized in 1815 by the French writer Francois Rene de Chateaubriand in his articles published in the Conservative magazine. The development of the ideas of conservatism has never been smooth and smooth.

E. Burke writes about this in "Reflections on the Revolution in France " (1790): 1) religion is the basis of civil society and is superior to political and social activity; 2) society is a product of historical development. If society needs change, these changes must be made gradually; 3) people's feelings are of great importance in social life; 4) society should be superior to the individual. The rights of the individual are therefore related to his duties; 5) any society consists, first of all, of a hierarchy of different strata, groups and individuals; 6) the existing methods of governing society and the state are preferable to new, unused methods. One can observe in his approach that conservative views are mixed with liberal ideas.

The positivism of O. Conte, which began to take shape in the first half of the nineteenth century, and the socialism of A. C. Saint-Simon, manifested itself as a reaction to the ideas of social atomism, enlightened individualism, and the results of the great French Revolution. In their search for an organic basis for the organization of society, they found the founders of the traditions of continental conservatism, J.S. de Mestr and L. were very close to de Bonald. Explaining power and society as the will of the Creator, L.A. de Bonald saw power as a living being aimed at preserving society. He asserts that the will of this being is the law, and its action is the

authority[3].

According to the priests of conservatism, the implementation of the ideas of education and the French Revolution can lead to the devaluation of ancestral traditions, the violation of the spiritual and material dignity of society.

In his research, the Russian researcher V. Gusev states that "Conservatism is an important systematic principle that manifests itself in the form of a type of political thinking, a political idea, the principle of adherence to social traditions" [5].

In general, the idea that the real world has some kind of vital beginning prevails among theorists with conservative views. The central point of the philosophy of conservatism is the belief in the sinful nature of man. In the opinion of the founders of conservatism, only a society based on a hierarchical system was considered natural and legitimate. If liberalism and socialism emerged as a class ideological and political current of the bourgeoisie and the working class, it is very difficult to express a single and clear opinion on conservatism. In general, conservatism reflects the ideas, ideals, behaviors, goals and values of social groups at risk of objective trends in socio-historical and socio-economic development. It has also reflected the ideas of social groups that are being felt and felt by growing difficulties and pressure by democratic forces.

At the same time, the concept of "conservative" includes a set of socially accepted and accepted values that define a particular behavior and way of thinking of individuals.

From an epistemological point of view, conservatism reveals two different essences of the socio-political process. It is, on the one hand, evolution, development, the rejection of the past, and the discovery of novelty, while, on the other hand, it is a formed state that embraces all the vital, continuous, and universal features of the past. In other words, conservatism reflects the fact that it is possible to talk about history and the socio-historical process only in the interdependence of concepts such as development and innovation on the one hand, and the preservation of the legacy of the past on the other. Hence, conservatism emphasizes the need to preserve traditional rules, norms, hierarchical power, social and political systems and institutions.

As the world is multifaceted and constantly changing, conservatism cannot deny all of change. As a result of historical development, conservatism has undergone as important changes as liberalism. It became an idea that defended the interests of big capital as bourgeois relations settled. Conservatives, like liberals, demanded that the market ensure freedom of competition, limiting state intervention in the economy. As an example, since the second half of the nineteenth century, and especially in the twentieth century (mainly after World War II), as conservatives have adapted to socio-economic and socio-political



changes, they have adopted many important ideas and principles that were previously rejected. For example, free market relations, constitutionalism, representation of government and the electoral system, parliamentarism, political and ideological pluralism. Conservatism underwent profound changes in this direction in the 1970s and 1980s. In this regard, even in the history of conservative ideas in the United States, one can see complementary, sometimes contradictory aspects.

The role of "republicanism" in the American system of political ideas was important and had a strong influence on the formation of liberal and conservative ideas. President Abraham Lincoln described conservatism as based on antiquity and tradition and opposed to innovation. At the end of the 19th century, the Democrats, led by President Grover Cleveland, campaigned against high taxes, corruption, and imperialism, advocating business interests. In general, conservative ideas were supported during this period by separate groups of Democratic and Republican parties.

The rise of the Conservative wave in the United States in the 1930s is also reflected in President Roosevelt's policy of expanding state control. Although the United States entered the twentieth century with old liberal approaches, conservative principles began to determine the political course of the state. If after World War I American conservatism was divided in accordance with the return of U.S. foreign policy to traditional isolationism, after World War II the main foreign policy priority was taken over by liberals. The Conservatives had to reckon with the Marshall Plan, the creation of NATO, and US international military involvement. Because without them, the Cold War would not have been possible[7]. At the same time, the influence of conservative views was felt. Calls to not retreat from traditional approaches have been regular. In this regard, Plekhanov, a Russian researcher, argues that "liberals' foreign policy strategies, which ensure the unimpeded expansion of American capital to all corners of the world, called for conservative isolationism and a tradition of non-interference against the creation of an international economic and political order"[9]. However, it should be noted that the idea of isolationism of U.S. conservatives after World War II was not seen as a barrier to America from the world, but as a barrier to international organizations and clear foreign policy commitments. That is, the U.S. does not need to understand limiting its "free" hand on the world stage. Researcher Melville acknowledged that this was the case in keeping with the one-sided principle[8].

After the 1950s, one of the new directions of conservatism emerged in the United States as neoconservatism as a political-philosophical view. Its main feature in international relations is that

neoconservatives supported an interventionist approach to the protection of national interests.

The decision of neoconservatism is not accidental. It was formed in order to oppose neoliberalism and socialism. Neoliberalism recognizes the need for state intervention in economic activity and supports the development of state social programs. Neoconservatism, on the other hand, requires limiting state intervention in the economy. Antitatism - the limitation of the social functions of the state - neoconservatism is a defining feature of the terms of the ideological-political course. According to neoconservatives, "a less governing government is the best government."

Neoconservatives oppose taxes on large capital in order to redistribute resources in favor of the poor. They demand the reduction of the state's social programs as a fierce enemy of equal distribution. According to neoconservatives, the current state should create equality of opportunity, not equality of results, for the people. The transformation of the state into a "milking cow" destroys and fires people. Everyone should rely not only on the state, but also on their own strength and those of their loved ones.

The formation of a new American conservatism began to emerge in the harmony of the traditional foundations of conservatism and liberal ideas. That is, it is necessary to acknowledge the change in the original conservative ideas. Clark argues that modern American conservatism arose from the alliance of classical liberalism and social conservatism in the late nineteenth and early twentieth centuries[1].

One of the distinctive features of American conservatism is its theoretically diverse district and lack of internal unity [4]. Therefore, it is somewhat difficult to type it. Nevertheless, research has tried to divide American conservatism into different groups and types. In particular, A.Galkin divides the right into radical and moderate conservatism, A.Yu.Melville into traditional, libertarianism and neoconservatism, and Sogrin into social (new) conservatism and neoconservatism.

The diversity of conservative rules has led to a change in attitudes towards conservatism, which was built as an ideological phenomenon in the 1970s and 1980s. Initially, the term "conservatism" was less popular, but in the late 1970s it became popular again. In a number of European countries, political parties have emerged under the name of "conservatives". The arrival of Reagan in the U.S. government in 1980 and his re-election in 1984 would give the Thatcher-led Conservative Party three victories in Britain. At the same time, the results of the parliamentary and local elections in Germany, Italy, and France indicated that the ideas and principles pursued by these forces were in line with the majority of the population.



The peculiarity of conservatism in the 1970s and 1980s was that the conservatives themselves, who opposed scientific and technological progress, turned out to be supporters of this development.

When it comes to the place and nature of U.S. conservative ideas on the foreign policy agenda, one can see that the competition between the level of development of conservative ideas and the liberal current observed over the last century has continued unabated. In particular, for liberals, international law, international organizations, and universal morality played a key role in defending American national interests, while for conservatives, the first priority for the U.S. was to balance the forces of its close allies in the international arena and protect American business. Hence, American conservative foreign policy traditions have emphasized the distrust of these multilateral international institutions and the predominance of unilateral actions by the United States and its allies. Adherence to tradition has led to increased focus on military capabilities and increased defense spending. Such features of American conservatism can also be seen in today's foreign policy strategies. There have also been a number of "corrections" to conservative approaches and a combination of liberal ideas without changing the fundamental ideological foundations. For example, the conservative presidents R. Nixon and R. Reagan, who have achieved a number of successes in the international arena, have achieved great success as a result of its modernization, moving away from the original conservative ideas. For example, we can see that the Nixon government stopped the Vietnam War, and relations with the USSR and China stabilized. Kissinger described the situation as "... a combination of conservative White House strategies with liberal tactics"[6].

We can also see the disarmament agreements signed by the Reagan government with the USSR. Throughout the Cold War, American conservative foreign policy views led to a tendency to adapt to the innovations promoted by the liberals - the UN, NATO, arms control, the struggle for human rights. However, measures taken by the Republican government in the late 1980s and early 1990s led to increased confidence in conservative methods, including support for business investment, a reduction in the budget deficit and falling inflation, and the rejection of liberal models in managing the American economy.

In the early 1990s, the U.S. began to rank high among the major capitalist countries in terms of economic growth. The wave of conservatives in the 1980s and 1990s was much higher than the Liberals expected, which was seen as a severe blow to liberal internationalism. Russian American scholar T.A. Shackleina admits that in a 1992 poll, Americans did not support the idea of American world leadership. They cite financial costs as the reason. So

the country needs a president who needs to focus more on domestic issues. President George W. Bush has focused more on foreign policy [10].

During the 1990s, U.S. conservatives set themselves the goal of removing the remnants of liberal internationalism from American foreign policy practice and gaining military-political supremacy in putting and safeguarding national interests at the heart of American foreign policy. In addition, at the threshold of the 21st century, a number of ideas and concepts related to U.S. foreign policy have been put forward by conservative circles. Examples include the Rumsfeld Commission Report (1998) and the US National Security Report (2001).

## CONCLUSIONS

From the point of view of the scientific schools that underpin the theory of world politics and international relations, American conservatives are generally seen as supporters of the "realistic paradigm" (school of political realism), while liberals are seen as "idealists". In politics, conservatives are supporters of elite governance, and power should be run by a group of people with the best professional training. It is merocracy, that is, the power of those who deserve to be ruled.

In the United States today, the term "conservative" is interpreted differently than it was originally used. While the original conservative idea was based on the strong connection between the state and the church and adherence to tradition, later conservatism-based views also changed as a result of industrial coups. Nevertheless, the influence of currents that interpret conservative ideas differently remains.

**Демак, қуйидаги умумий хулосаларни илгари суриш мумкин:**

The main features of conservative ideas in the United States are related to the evolution of conservatism;

The idea of U.S. conservatism has a three-century history, changing and becoming more complex at different times;

In the last quarter of the twentieth century, the rise of public interest in conservative ideas in the United States led to an increase in its place in socio-political life;

The influence of liberal ideas and views can also be seen in modern interpretations of the doctrine of conservatism. Representatives of this movement, which for almost two centuries has denied the idea of socio-economic equality, today have to recognize the principles of universal suffrage, social protection of citizens, individual rights and freedoms, formed on the basis of liberalism. For example, the "new right" movement that emerged at the heart of conservatism in the second half of the twentieth century also advocated a free market economy, social and political freedoms;



After the end of the Cold War, conservative ideas became more active in U.S. foreign policy strategies, and efforts to remove the remnants of liberal internationalism intensified. In addition, conservative strategies were combined with liberal tactics;

The peculiarity of the conservatism of the 70s and 80s is that the conservatives themselves, who opposed scientific and technological progress, turned out to be supporters of this development;

One of the directions of conservatism in the United States, neoconservatism, was formed as an ideological movement that embodied principles such as sharp political decision-making, strengthening the armed forces, and putting national interests first, and began to be seen as an ideological source for shaping U.S. foreign policy strategies.

Thus, in the ideology of conservatism, the preconceived notions of the family, religion, morality, the privileged role of certain social groups are closely linked with new views and values, individualism and market freedom. This ideology, in contrast to liberalism, has a profound effect on the public consciousness of Western countries. Types of modern conservatism at the national and international levels consist of a clear set of complex concepts, ideas, principles, ideologies. At the same time, when comparing and analyzing individual national variants of conservatism, such as conservative currents in the United States, it is observed that each of them has its own diversity and contradictions.

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# THE SPIRITUAL ESSENCE AND SOCIAL SIGNIFICANCE OF THE EDUCATION SYSTEM IN UZBEKISTAN

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## ABSTRACT

*This article discusses the specifics of the education system in Uzbekistan during the years of independence, the spiritual nature of education, the basis of education based on national values. At the same time, opinions were expressed in terms of such tasks as the formation of high humanitarian qualities in a person, the integration of the principles of national and religious tolerance in the National Education.*

**KEY WORDS:** *education, upbringing, national values, spirituality, national education system, culture, mental.*

## INTRODUCTION

It is known that the creation and strengthening of the spiritual and moral environment of physically strong, mentally rich and morally pure children is a matter of national importance. Because all the changes that take place in social life, that is, the successes and failures, the complexities and contradictions in it, are reflected in the family. Accordingly, the issues of family and family upbringing have always been and will remain a topical issue.

The formation of a mentally and morally healthy person leads to spirituality, social maturity based on the views, morals and activities of ancestors in the educational process, and the national values of the people lead to the effectiveness of education. Therefore, education must have a national and spiritual basis.

The substantiation of the spiritual foundations, first of all, makes it possible to carry out national education; secondly, it creates an education system based on national and universal values; thirdly, national-spiritual norms are contained in the nature of the individual. In this sense, the education system of Uzbekistan is purely national, secular and democratic.

The main national-spiritual foundations of education are embodied in the spiritual heritage.

## MATERIALS AND METHODS

The spiritual essence and social significance of the education system of Uzbekistan is determined

by the fact that it is based on national and spiritual foundations in the upbringing and development of the individual. The main goal is to "grow up as a person worthy of the invaluable heritage of our ancestors, national values and traditions" [2].

The spiritual essence of the education system of our country is that it carries out national education. National upbringing is the upbringing of an individual on the basis of a combination of national and universal values.

M.Kudratov, a pedagogical scientist who has studied the issue of national education, writes:

"The national education system is a pedagogical process of forming a harmoniously developed generation of the Uzbek people, based on the specific national cultural behavior, moral values and educational requirements for strengthening national independence, closely linked with all aspects of life" [3].

In this sense, national education is based on the laws of succession and continuity in the education system of Uzbekistan.

National education has the following features as an embodiment of the national-spiritual foundations of education:

- Goal-oriented educational activities based on national values;
- a unique form of universal education, unique and appropriate for each nation;
- a tool for the preservation, restoration and development of the people and their culture (UNESCO definition);



- An integral part of the goals, objectives and principles of the national training program, etc.

In Uzbekistan, through national education, the individual is brought up in accordance with the needs of the people, society and the state. As a result, in the transition period, the individual has become "the main subject and object of the system of training, the consumer of services in the field of education and their implementation" [1].

In particular, through national education, a person has the inherent shame, modesty, modesty, modesty, pride, honor, self-respect, dignity, humanity, compassion, generosity, kindness, forgiveness, humanity, a good land is divided into those capable of forming qualities and characteristics such as neighborliness, compromise.

Values such as family, child rearing, caring for the elderly become a habit of the individual. Living for honest work, becoming rich through work, supporting others, being worthy of the people and knowing that the Motherland is sacred and in its service have become a vital skill in today's people.

The once deliberately distorted spiritual consciousness, culture and position of the nation have been restored. The names and heritage of the great ancestors who fell victim to repression from the homeland were restored, and man found his dignity in his homeland. The social movement "We are not inferior to anyone and we will not be inferior to anyone" was formed. The identity of more than 130 nations and peoples has been preserved, and national unity has emerged in society. All this is a product of national education, which is the spiritual essence of the education system.

One of the peculiarities of the current stage of human development is related to the reflection of national characteristics in the educational process. Consequently, the national customs, traditions, values that apply in any society are formed under the influence of the national mentality.

At the same time, it is necessary to pay special attention to the problem of national mentality. The word "mentality" is translated from Latin and means "mind, intellect, intellect, perception" and in a broad sense means a specific way of thinking, a different form of mental qualities and attributes. This term, first introduced into the language of communication by L. Levi-Brule, L. Fevr, M. Blok, refers to the psychological characteristics of national-ethnic and socio-cultural communities. It emphasizes that the members of this community have the same or similar perception of social reality, evaluate political events in terms of norms and patterns of behavior formed in the community[4].

Mentality is defined in the book "Independence: An Explanatory Scientific-Popular Dictionary" as follows: power The mentality of a society, nation or individual also includes their

specific traditions, customs, traditions, religious beliefs and superstitions "[5].

## RESULTS

Since mentality is directly related to the way of thinking, it is appropriate to analyze the types of thinking that play an important role in a person's conscious activity.

1. The type of pragmatic thinking is formed on the basis of ideas about the usefulness of objects and events. In the current period of transition to market relations, it belongs to many individuals and social groups. Often, this type of thinking encourages the self, the individual, the social group, and the nation to develop themselves, to seek out the untapped intellectual potential of members of society.

2. The type of collective thinking is formed on the basis of the priority of the interests of the community and society. Of course, it is natural for each individual to feel a certain sense of concern for the community and society to which he or she belongs. As a subject of society, a person is obliged to take into account the interests of the majority in his private life. Because the favorable environment in a society created on the basis of common interests is the basis for the successful implementation of his personal activities.

3. The type of scientific thinking is formed under the influence of everyday knowledge and information and is mainly based on logical-rational principles. Its role and place in revealing the content and essence of natural and social phenomena, in the timely identification of their problems and in the search for appropriate scientific solutions is great.

4. The authoritarian type of thinking is formed under the influence of the views of the leader in the community and society, on the basis of an approach to objects and events on the basis of feelings of national pride. This type of thinking is more prevalent in Eastern countries than in Western countries. Naturally, where collectivism reigns, where national pride and arrogance are strong, strong leaders emerge.

5. The traditional type of thinking is based on the components of the spirituality of society - the system of national traditions, customs and traditions. This type of thinking has its rightful place in all spheres of society. It is especially important in educating people in the spirit of devotion to the Motherland, in preserving the national culture and in finding specific solutions to many other social problems.

6. The formation of the type of legal thinking is explained by the need for legal norms and principles in society. As an active form of social consciousness, law is consistently manifested



in all spheres of human and social relations. The realization of the individual's rights before society, the state, in turn, his duties and responsibilities before these social institutions, is based on legal thinking.

7. Valuable thinking is based on a certain system of aesthetic, ethical ideas and norms that exist in society. These aesthetic, moral ideas and norms are formed as a result of the social activity of an individual, a social group, and a nation. This type of thinking is reflected in the priceless aesthetic and moral masterpieces left by our ancestors, and it plays an important role in the education of harmoniously developed people.

8. The type of religious thinking is formed and developed on the basis of religious principles. It is the oldest and most ancient of the other types of thinking. This type of thinking has existed since the creation of man. Some types of thinking are often combined with religious thinking. In particular, traditional, value-based, collective, and in some special cases, even pragmatic forms of thinking are among them. For example, the introduction of a dialectical relationship between religious and pragmatic thinking, according to M. Weber, served as one of the important spiritual foundations for the development of capitalism in Europe.

Religious thinking also plays an important role in our society. Especially in the moral upbringing of young people, its role in combating the most flawed negative vices in society, such as drug addiction, theft, murder, immorality, is unique.

At the same time, religious thought in our country is based on the Qur'an and hadiths, as well as prominent scholars and scholars of the Islamic world: Abu Hanifa an-Nu'man ibn Sabin (pseudonym Imam A'zam), Muhammad al-Bukhari, al-Termizi, Bahauddin Naqshbandi, Ahmad Yassavi, Khoja Ahror. it can have a positive meaning in our social life only if it is formed and developed on the basis of his works. If the religious thinking of citizens, especially young people, is actively influenced by the ideology of various negative currents of extremism, which mask Islam for political purposes, but in fact only tarnishes Islam, then there is a serious threat to the development of society.

Islam Karimov expressed his clear attitude to these negative events in response to questions from a Turkiston-Press correspondent: "... At a government meeting in the Oliy Majlis, I strongly stated that we will not hand over our youth to anyone. Developing this view, I say that as the leader of Uzbekistan, I will never allow any evil forces to insult our sacred religion of Islam, the faith of our ancestors, our Muslim citizens, and endanger the life of our society[6].

The mind, perception, and intellect of any nation depend on a number of factors, such as the

conditions in which it lives, its history, and what nations it neighbors. As the Uzbek people live at the crossroads of important trade, science, architecture and handicraft centers, roads connecting nations and countries, their mentality, intellect, ingenuity and intelligence have been sharpened. That is why dozens of world-famous thinkers, scientists, scholars, statesmen and representatives have left our country.

In fact, the process of formation of the mentality of the Uzbek nation has a history of almost three and a half thousand years. The Uzbek people have enriched human culture with priceless gems. However, our people experienced a long period of stagnation in the XVI-XX centuries. Due to great geographical discoveries, unprecedented theories and technical inventions, Western countries have overtaken their development; Due to the "care" of the khan-amirs, colonialists, oppressors, our people have moved away from such aspects as entrepreneurship, the ability to think independently, many of us have become slaves to the spirit of muteness, apathy, dependence. Therefore, it seriously damaged the mentality of the Uzbek nation. Especially during the Soviet regime, he was deprived of the opportunity to fully explore his history, traditions, culture, customs and rituals.

Independence has opened up great opportunities for the Uzbek people to study, restore and enrich their mentality. Working on the theory of mentality and restoring the truly rich and colorful history of the Uzbek people has become one of the urgent tasks of the social sciences today.

## CONCLUSIONS

National characteristics of the Uzbek people include tolerance, mutual assistance, respect and obedience to the elders, deep faith in Islam, tolerance, tolerance, land tenure and respect for the land, a sense of community.

These national characteristics are, of course, reflected in national education. The social significance of the education system of Uzbekistan is determined by the harmonious upbringing, professionalization and preparation for work. The new unique model of the education system plays an important role in this.

On the basis of this model, our country is training personnel with intellectual potential, high spirituality and mature professional training.

At the same time, it should be noted that today in Uzbekistan, not only the general secondary education of the younger generation, but also their secondary special education has been achieved. A young girl who has reached puberty has two or more specialties and is getting a guide to life and activities. This is a unique and unique achievement in the Commonwealth of Independent States.



It should also be noted that primary, general secondary and secondary special education is provided free of charge and compulsorily. In this sense, the education system and its model in our country are yielding incomparable social results.

Thus, the spiritual essence and social significance of the education system in Uzbekistan has its own characteristics.

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# SYNTHESIS OF THIAZOLYL-PYRAZOLE DERIVATIVES AS ANTI CANCER AGENTS

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## ABSTRACT

*In our last article we performed molecular modelling studies on a set of 42 molecules of thiazolyl-pyrazole derivatives. We designed new chemical entities with CombiLib:Vlife MDS software. We further performed docking studies to study the interaction of the designed new chemical entities with epidermal growth receptor factor (EGFR). We predicted 5 best compounds which fitted into the pocket of EGFR and may exhibit anticancer activity. In this article we present the synthesis and spectral evaluation of the synthesized compounds. We have further performed biological screening by Microculture Tetrazolium Test (MTT) assay for evaluation against breast cancer and lung cancer cell lines. Compounds KS-1, KS-3, KS-5, KS-6, KS-11 were found to have percentage inhibition of 82.12%, 22.66%, 69.57%, 8.09%, 48.02%, at a concentration of 60 µg/ml and 64.03%, 21.82%, 38.83%, 3.23%, 41.37%, at a concentration of 80 µg/ml as against standard drug 5-fluorouracil 1.94%. This indicated that these compounds exhibited excellent activity against cell lines in vitro.*

**KEYWORDS:** Synthesis, IR, NMR, EGFR.

## INTRODUCTION

Thiazole and pyrazole derivatives have been found to have excellent anti-tumour activity as illustrated by literature.[1],[2] Epidermal growth Factor Receptor is one of the very important and widely researched target in study of anti-cancer derivatives.

Protein Kinases are important regulators of cell function that form one of the biggest and most functionally diverse gene families. They serve to orchestrate the activity of almost all cellular processes. Kinases play an important role particularly in signal transduction and co-ordination of complex functions

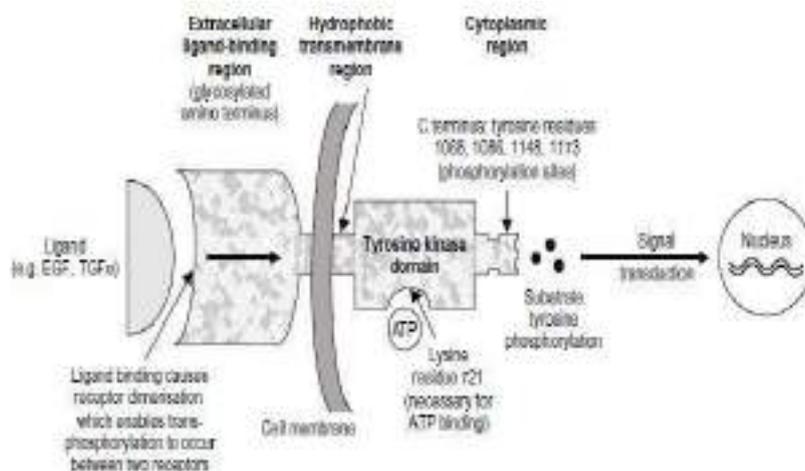


such as the cell cycle.<sup>[3]</sup> EGFR is a 170 kDa protein containing approximately 20% of carbohydrate of its molecular mass and is heavily N-glycosylated.<sup>[4]</sup> Characteristically the proliferation and the survival of carcinoma cells are found to be sustained by a network of receptors/ligands of the ErbB family.

Thus this phenomenon is suggestive of therapeutic approaches, towards anti-EGFR agents and might depend on the total level of expression of ErbB receptors and ligands in tumor cells. On average, 50% to 70% of lung, colon and breast carcinomas have been found to express EGFR or ErbB-3. Research indicates that the overexpression of ErbB-4 in breast carcinoma is found in approximately 50% of the tumors. Expression of ErbB-4 has been recently shown to occur in 22% of human primary colon carcinomas. EGFR can

play an anti-tumor role in late-stage breast cancer as is illustrated with loss of EGFR expression in metastatic outgrowth proficient D2. A1 breast cancer cells.<sup>[5]</sup> Cetuximab (IMC-C225/Erbitux) is an FDA approved human– murine chimeric anti-EGFR monoclonal antibody. Research proved that KRAS, a wild-type advanced colorectal cancer, responded positively to Cetuximab, an EGFR inhibitor. Cetuximab binds to the second (L2) domain of EGFR thereby inhibiting its downstream signaling by causing receptor internalization and restricting ligand-receptor interaction. It caused tumour regression by 10.8% and delayed the tumour by 1.5 months when used as single therapy. Similarly panitumumab is used either in combination or as monotherapy in treatment of EGFR-expressing metastatic colorectal cancer.<sup>[6]</sup>

## EGFR STRUCTURE AND FUNCTION



**Fig. 1. Structure of EGFR**

There are 3 major regions in EGFR. They are as follows: (i) the glycosylated N-terminus extracellular region (621 amino acids); (ii) the hydrophobic transmembrane region (23 amino acids); and (iii) the C-terminus cytoplasmic region (542 amino acids), which contains the tyrosine kinase domain (approximately 250 amino acids). The lysine residue 721 within this domain binds to ATP, generating phosphate for the tyrosine phosphorylation reaction. The major sites of phosphorylation are located at the C terminus (i.e. tyrosine residues 1068, 1086, 1148 and 1173).

Stimulation of EGFR tyrosine kinase following binding of a ligand [e.g. transforming growth factor- $\alpha$  (TGF $\alpha$ ) or epidermal growth factor (EGF)] to a receptor leads to its transphosphorylation and to phosphorylation of tyrosine residues from various cellular substrates. As a consequence, signalling pathways are activated such that extracellular signals are transduced to intracellular responses. The integrated biological responses to EGFR signalling are

pleiotropic and include different processes such as mitogenesis or apoptosis, increase in cell moments, protein synthesis, and differentiation or dedifferentiation of cells. In addition to these processes upward EGFR signalling has also been associated with progress of tumor that eventually proceeds for invasion and metastasis.<sup>[7]</sup>

As stated earlier we have performed molecular modelling and drug design studies on a set of 42 molecules. We optimised the lead nucleus predicted 12 potent EGFR derivatives. Further we performed docking analysis and filtered 5 most potent anti-cancer compounds having drug like properties. In this paper we are presenting synthesis, spectral analysis and anticancer evaluation of these compounds.<sup>[8]</sup>

## EXPERIMENTAL WORK

**Synthesis of Substituted chalcone<sup>[9]</sup> Reaction:**  
Synthesis of substituted chalcones.

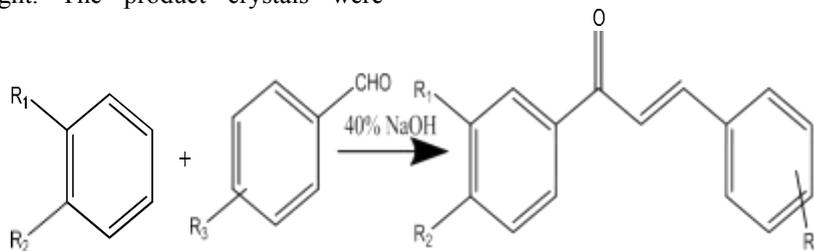
### Procedure (S<sub>1</sub>-S<sub>3</sub>)

Substitutes acetophenone or was added to



equimolar quantities of appropriate substituted aryl aldehyde, dissolved in ethyl alcohol. To this solution 40% sodium hydroxide was added dropwise and the reaction mixture was stirred for 40 min and then kept in refrigerator overnight. The product crystals were

filtrated and washed carefully with ice water and cold methanol to neutral reaction. The resulting chalcones were purified by recrystallisation from methanol.

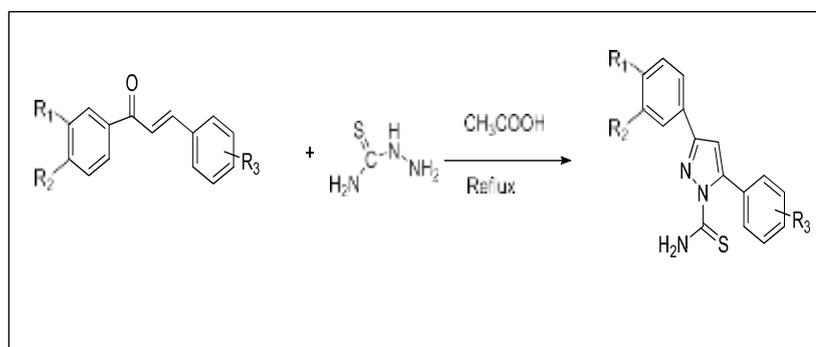


- a- R<sub>1</sub> -COOH, R<sub>2</sub> -CH<sub>3</sub>, R<sub>3</sub> -OH b- R<sub>1</sub> - CH<sub>3</sub>, R<sub>2</sub> -CH<sub>3</sub>, R<sub>3</sub> -OCH<sub>3</sub> c- R<sub>1</sub> -CH<sub>3</sub>, R<sub>2</sub> -OH, R<sub>3</sub> -OCH<sub>3</sub>  
d- R<sub>1</sub> -CH<sub>3</sub>, R<sub>2</sub> -COCH<sub>3</sub>, R<sub>3</sub> -NH<sub>2</sub> e- R<sub>1</sub> - CH<sub>3</sub>, R<sub>2</sub> -CH<sub>3</sub>, R<sub>3</sub> -OCH<sub>3</sub>

#### Synthesis of Pyrazole derivative containing thiourea skeleton<sup>[10],[11]</sup> Synthesis of compounds SI1-SI3 Reaction

A mixture of substituted chalcone, thiosemicarbazide and acetic acid was heated at reflux for 3 hours, then poured onto crushed ice. The precipitate was

separated by filtration, washed with water and crystallized from methanol to obtain the pyrazole derivative containing thiourea skeleton.

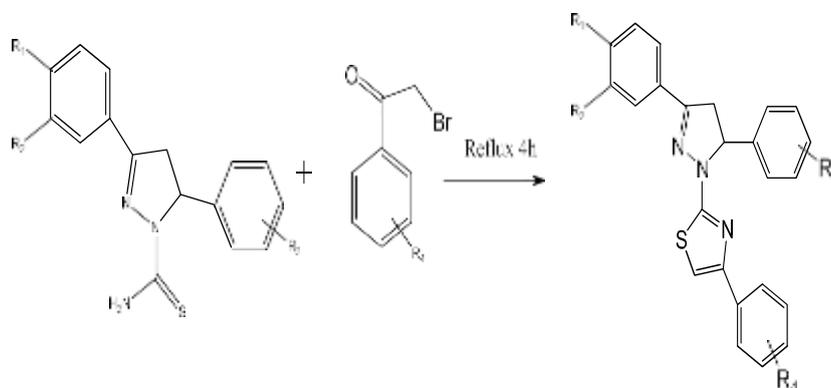


Synthesis of Thiazolyl -Pyrazole derivatives

#### Synthesis of compound KS1-KS11

##### Procedure

A mixture of pyrazole derivative containing thiourea skeleton and substituted 2-bromoacetophenone was heated at reflux for 4 h, then poured onto crushed ice. The precipitate was separated by filtration, washed with water, and crystallized from methanol to obtain the derivatives of thiazolyl-pyrazole.



- a. R<sub>4</sub>- cyclopropyl d. R<sub>4</sub>- cyclopropyl,  
b. R<sub>4</sub>-CH<sub>3</sub> e. R<sub>4</sub>- cyclopropyl,  
c. R<sub>4</sub>-CH<sub>3</sub>

5 compounds KS-1, KS-3, KS-5, KS-6, KS-11 were synthesized and spectrally evaluated.

### Experimental

All the chemicals used were procured from Merck and SD fine chemical and purity of starting materials used for reactions was confirmed by checking their melting point or boiling point and by thin layer chromatography.

All the reactions were monitored using thin layer chromatography. The appropriate mobile phases (solvent systems) as applicable were developed using „silica gel G” as stationary phase. Melting points were determined in open capillary tube using Veego melting point apparatus and are uncorrected. FT-IR (KBr) spectra were recorded on “JASCO FT-IR V-460 plus” Spectrophotometer (Vmax in cm<sup>-1</sup>). <sup>1</sup>H NMR spectra of synthesized compounds were recorded on “FT-NMR VARIAN MERCURY YH-300” Spectrometer at 300 MHz Frequency in CDCl<sub>3</sub> using TMS as internal standard (chemical shift δ in ppm) at Shimadzu Analytical Centre and NMR Facility, Dept. of Chemistry, University of Pune. LCMS were recorded on “2010EV LCMS Shimadzu” instrument by direct injection method. Purity of the compounds was checked on „Silica Gel G” coated on thin layer chromatographic plate procured from Merck, eluent was the mixture of different polar and non-polar solvents in varying proportions and detection was done either by observing in UV light or exposure to iodine vapours as required. The absence of TLC spots for starting materials and appearance of new TLC spot at different R<sub>f</sub> value ensured the completion of reaction. The products of all the reactions were purified initially by different workup processes and recrystallization using suitable solvents. The absence of any impurity of starting material or possible by-product was ensure by performing qualitative organic analytical tests for various functional groups and by single TLC spot of product.<sup>[12-15]</sup>

### RESULTS AND DISCUSSION

The thiazolyl pyrazole are known to be pharmacologically active compounds. The present study involves multistep synthesis of 4-acetyl-2-hydroxy benzoic acid, 1-(3,4- dimethylphenyl) ethanone, 1-(3-hydroxy 4-methylphenyl) ethanone derivatives of chalcones followed by synthesis of thiazolyl-pyrazole derivatives. As predicted by 2D and 3D QSAR , it was found upon synthesizing the compounds that Ring A and ring B- Dimethoxy substitution is important for activity on ring A along with chloro substitution at-R2 or -R4 (- meta position) on the ring is valuable for improving anticancer activity.. Steric substitution at R1 position of ring A decreases activity. The activity of compounds was found to be more than standard drugs.

#### Experimental Compound KS-1

#### 4-(1-(4-(4-cyclopropylphenyl)thiazol-2-yl)-5-(4-hydroxyphenyl)-4,5-dihydro-1H- pyrazol-3-yl)-2-hydroxybenzoic acid

For compound KS-1, yield 70 % M.P-245°C, IR(KBr) cm<sup>-1</sup> 1685 (COOH), 1640.77

(Thiazole -C=N), 1371 (Phenolic OH) 1327 (-CN vibration), 1095 (Aromatic tertiary nitrogen), 116.78 (-C=S of thiazole ring), 3381 (CH<sub>2</sub> stretching of cyclopropane); <sup>1</sup>H NMR(CDCl<sub>3</sub>) delta ppm, 11.3-12 (s, 1H of COOH of phenyl ring), 10-10.2 (s, 1H of OH of phenyl ring), 6.75-6.90 (s, 2H of C-H of phenyl ring), 7.8-8 (s, 2H of C-H of imidazole ring), 7.2-7.3 (s, 1H of thiazole ring), 3.0-4.0 (s, 1H of cyclopropyl ring).Elemental Analysis: C, 67.59; H, 4.66; N, 8.45; O, 12.86; S, 6.44

**Compound KS-3****3-(3,4-dimethylphenyl)-5-(4-methoxyphenyl)-1-(4-p-tolylthiazol-2-yl)-4,5-dihydro-1H-pyrazole**

For compound KS-3 yield 75%, M.P 240°C, IR(KBr)  $\text{cm}^{-1}$  2920.23 (CH Ar), 1640 (Thiazole -C=N), 1016 ( $\text{OCH}_3$  (-C-O-C)), 1438 (- $\text{CH}_3$ );  $^1\text{H}$  NMR( $\text{CDCl}_3$ ) delta ppm, 2.5-2.6 (s, 3H of  $\text{CH}_3$  of phenyl ring), 4-4.1 (s, 3H of  $\text{OCH}_3$  of phenyl ring), 7-7.1 (s, 2H of C-H of phenyl ring), 7.8-8 (s, 2H of C-H of imidazole ring), 7.2-7.3 (s, 1H of thiazole ring).

Elemental Analysis: C, 74.14; H, 6.00; N, 9.26; O, 3.53; S, 7.07.

**Compound KS-5****1-(5-(5-(4-aminophenyl)-1-(4-(4-cyclopropylphenyl)thiazol-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)-2-methylphenyl)ethanone**

For compound KS-5 yield 69%, M.P 180°C, IR(KBr)  $\text{cm}^{-1}$  1720 (C=O of  $\text{COCH}_3$ ), 3560 (-NH primary of  $\text{NH}_2$ ), 1465 (-C=C aromatic stretching), 1087.85 (-CN tertiary amine), 1282 (-CN vibration),  $^1\text{H}$  NMR( $\text{CDCl}_3$ ) delta ppm, 3-3.1 (s, 3H of  $\text{COCH}_3$  of phenyl ring), 3.55-4 (s, 3H of  $\text{NH}_2$  of phenyl ring), 7-7.1 (s, 2H of C-H of phenyl ring), 7.8-8 (s, 2H of C-H of imidazole ring), 7.2-7.3 (s, 1H of thiazole ring).

Elemental Analysis: C, 73.14; H, 5.73; N, 11.37; O, 3.25; S, 6.51.

**Compound KS-6****5-(5-(4-methoxyphenyl)-1-(4-p-tolylthiazol-2-yl)-4,5-dihydro-1H-pyrazol-3-yl)-2-methylphenol**

For compound KS-6 yield 75%, M.P 230°C, IR (KBr)  $\text{cm}^{-1}$  1371.39 (Phenolic-OH), 1012.6 (-C-O-C of  $\text{OCH}_3$ ), 1689 (-C=N- of thiazole stretching), 2962.66 (CH-Ar),  $^1\text{H}$  NMR( $\text{CDCl}_3$ ) delta ppm, 3.9-4 (s, 3H of  $\text{OCH}_3$  of phenyl ring), 2.6-2.7 (s, 3H of  $\text{CH}_3$  of phenyl ring),  $^1\text{H}$  NMR( $\text{CDCl}_3$ ) delta ppm, 7-7.1 (s, 2H of C-H of phenyl ring), 7.6-7.7 (s, 2H of C-H of imidazole ring), 7.2-7.3 (s, 1H of thiazole ring), 4-3-4.7 (s, 1H of OH of phenyl ring).

Elemental Analysis: C, 65.73; H, 5.24; N, 11.50; O, 8.76; S, 8.77

**Compound KS-11****4-(4-cyclopropylphenyl)-2-(3-(3,4-dimethylphenyl)-5-(4-methoxyphenyl)-4,5-dihydro-1H-pyrazol-1-yl)thiazole**

For compound KS-11 yield 68.66%, M.P 182°C, IR (KBr)  $\text{cm}^{-1}$ , 1469.76 (- $\text{CH}_3$ ), 2850.79

(Aromatic ring ( $\text{sp}^3$  stretching), 3342.64 ((CH-Ar), 3381 (Cyclopropyl group), 1689 (-C=N- (thiazole stretching),  $^1\text{H}$  NMR( $\text{CDCl}_3$ ) delta ppm, 3.9-4 (s 3H of  $\text{OCH}_3$  of phenyl ring), 2.5-2.6 (s, 3H of  $\text{CH}_3$  of phenyl ring), 7.1-7.2 (s, 2H of C-H of phenyl ring), 7.5-7.6 (s, 2H of C-H of imidazole ring), 7.3-7.4 (s, 1H of thiazole ring).

Elemental Analysis: C, 75.12; H, 6.09; N, 8.76; O, 3.34; S, 6.68

After spectral evaluation the compounds were further screened for anticancer activity.

**Biology**

The compounds were evaluated by MTT assay. MTT assay is a colorimetric assay, is based on the capacity of mitochondrial succinate dehydrogenase enzymes in living cells can reduce the yellow water soluble 3-(4,5-dimethyl thiazol-2-yl)-2,5 diphenyl tetrazolium bromide (MTT) into an insoluble coloured formazan product.<sup>[16,17]</sup> Two cell lines were taken lung cancer cell line NCI-H522 and breast cancer cell line (MCF-7). Following results were obtained.



Sr No	Concentration	OD	Percentage of cell inhibition	Percentage of cell cytotoxicity	IC <sub>50</sub>
1	Control (DMSO)	0.481	100	00	-
2	Std (5-flurouracil)	0.006	1.94	98.05	-
3	KS1-60 µg/ml	0.395	82.12	17.88	1.553
4	KS1-80 µg/ml	0.308	64.03	35.97	1.10
5	KS3-60 µg/ml	0.109	22.66	77.34	0.0665
6	KS3-80µg/ml	0.105	21.82	78.18	0.0455
7	KS5-60 µg/ml	0.215	69.57	30.43	1.239
8	KS5-80µg/ml	0.120	38.83	61.17	0.47
9	KS6-60 µg/ml	0.025	8.09	91.91	-0.297
10	KS6-80µg/ml	0.010	3.23	96.77	-0.419
11	KS11-60 µg/ml	0.231	48.02	51.98	0.70
12	KS11-80 µg/ml	0.199	41.37	58.63	0.53

## CONCLUSION

We conclude that we synthesized compounds predicted in our last paper. The compounds were further spectrally evaluated and biologically screened. We found that these compounds exhibited excellent anti-EGFR activity as compared to standard compounds. The compounds were target specific and hence would have less toxicities as compared to current therapy.

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## CLASSIFICATION OF INNOVATIVE METHODS USED IN HIGHER EDUCATION

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### ABSTRACT

*This article highlights the main classifications, which are used in the system of higher education. Moreover, different ideas of scientists analyzed and important points presented according to practical values.*

**KEYWORDS:** *methods, innovative, educational process, activity, terms, process, competition, research, pedagogical technology, stages, connection.*

### INTRODUCTION

Innovative activity in the educational process and its concepts were first studied in the works of such scientists as N.V. Kuzmina, S.M. Godnin, V.I. Zagvyazinsky, V.A. Kan-Kalik, F.N. Gonobolin, V.A. Slastenin, A.I. Shcherbakov. These studies reveal innovative activities in the teaching process in terms of the dissemination of novelty and advanced pedagogical practices.

As a follower of the above-mentioned researchers, A. Haylock, N. Gross, H. Barnet, J. Basset, D. Hamilton, R. Carlson, M. Mayez, D. Chen, R. Edem management, changes in the educational process, the organization of the spread, the issues that are important for the "life and activity" of innovation were discussed.

The socio-psychological aspect of innovation in the teaching process as well as teaching methods was developed by the American researcher, scientist E. Rodgers. This scientist studies the classification of categories of participants in the process of innovation in education, its attitude to innovation.

Innovative activity of professors and teachers of higher education institutions is one of the important problems of high school pedagogy.

The word innovation means innovation, innovation, innovation.

In his research, A.I. Prigogin argues that the word innovation is based on purposeful changes that

introduce new, relatively stable elements into a particular social organization, humanity, society, group. This, in turn, is an example of innovative activity.

A.I. Prigogin, B.V. Sazonov, V.S. Tolstoy, A.G. Kruglikov, A.S. Axiyezer, N.P. Stepanov and a number of other researchers divide the components of innovation processes into functional and direction: the individual micro-level of innovation and the interaction of individual innovations microsmatic.

The first round of this thoughtful approach covers a number of new ideas that have been put into practice.

In the second round of the approach, the interaction of the innovations introduced separately, their unity, competition, and, as a result, the substitution of one by another is discussed.

The scheme of the innovation process is described in the pedagogical literature. This scheme, in turn, includes the following steps:

1. The birth of an innovative idea or the creation of a concept of novelty is called the discovery phase.
2. Invention, or more precisely, the stage of innovation.
3. The ability to apply the innovation in practice is the stage of its proper use.
4. The stage of promoting the created innovation, ensuring its dissemination.
5. The dominant stage of innovation in a particular field. The novelty created at this stage loses its



novelty character, and an alternative form of it, which gives a perfect result, appears.

6. The stage of narrowing the scope of the innovation by replacing the old with the new, based on the proposed new alternative.

7. The European scientist V.A. Slasten believes that the creation and introduction of innovation is a set of goal-oriented innovation creation, dissemination and use, the purpose of which is to meet the needs and aspirations of people by new means. The authors of the systemic concept of innovation (AI Prigogin, BV Sazonov, VS Tolstoy) classify new processes according to two important aspects.

## MATERIALS AND METHODS

The first type involves simple, uncomplicated innovation processes. This is especially true for first-time developers.

The second round involves the development of a large-scale innovation. Innovation in a particular field is a dynamic system in which both internal logic and time are legally evolving and representing its interdependence with the environment. The concept of "new" is central to pedagogical innovation today.

In addition, there is an interest in conditional, private, local, and subjective innovation in pedagogy.

Private innovation V.A. Slasten found that in the process of modernization involves the renewal of one of the elements of a particular system product.

Conditional innovation is a set of known situations that lead to a complex and progressive renewal process.

Local innovation is defined by the use of innovation in a particular situation, a specific object.

Another type of subjective novelty is defined as the fact that the object itself is new to a particular object.

The concepts of novelty and innovation are different in the fields of science and research.

Innovation is a tool: a new method, methodology, technology and so on.

Innovation is education: a process that develops in stages with a specific purpose.

Explaining the concept of "new", the European scientist V.I. Zagvyazinsky noted that the "new" in education is not only this idea, but also a set of unique approaches, methods, technologies that have not yet been used.

R.N. Yusufbekova, an Uzbek scholar, sees pedagogical innovation in teaching and educating as a previously unknown and previously unrecognized situation, outcome, evolving theory, and the changing content of pedagogical reality leading to practice.

This scientist R.N. Yusufbekova divides the structure of the innovation process in pedagogical innovation into three blocks:

The first block is the block of innovation in the field of pedagogy. This includes the classification of completely new pedagogical innovations in the field of pedagogy, the conditions for the creation of innovations, the norms of innovation, readiness for its adoption, development and use, tradition and innovation, the stages of innovation in pedagogy.

The second block is the block of perception, assimilation and evaluation of innovation: this includes pedagogical communities, the diversity of processes of evaluation and mastery of innovation, conservatism and innovation in pedagogy, innovation environment, readiness of pedagogical societies to perceive and evaluate new.

The third block is the block of new use and its introduction, that is, the laws and types of new introduction, use and widespread introduction.

M.M. Potashnik's interpretations of innovation processes are also noteworthy. It provides the following structure of the innovation process:

- Structure of activity - a set of motive, purpose, task, content, form, methods, methodical components;

- Subjective structure - international, regional, district, city and other levels of the subjects of innovative activity;

- Content structure - educational work, management

- Emergence, development and assimilation of innovation;

- The structure of life cycles based on stages - the emergence of innovation

- Presence, rapid growth, maturation, diffusion (absorption, dispersion), modernization;

- Management structure - the interaction of 4 types of management actions

- Connection: planning, organization, guidance, control:

- Organizational structure - diagnostic, predictive, purely organizational,

- Practical, generalizing, applying.

The innovation process consists of a system that encompasses structural structures and laws.

There are 4 main laws of the innovation process in the pedagogical literature:

- The law of ruthless instability of the environment of pedagogical innovation;

- The law of final implementation;

- The law of periodic repetition and return of pedagogical innovation;

- The law of molding (stereotyping);

## RESULTS AND DISCUSSION

Today, the desire and attention to the use of interactive methods, innovative technologies, pedagogical and information technologies in the classroom is growing, one of the main reasons for this is the current situation. While traditional teaching



methods teach students to acquire only ready-made knowledge with a clear structure, modern pedagogical technologies allow students to search for, independently study, analyze and synthesize the acquired knowledge, and even to draw final conclusions. both teach themselves to accept. In this process, the professor-teacher provides an opportunity for the development, formation, acquisition of knowledge, as well as the upbringing of the individual, and at the same time acts as a leader, leader, mentor. This allows students to become key players in the learning process.

Therefore, the role and place of modern teaching methods, interactive methods, innovative technologies in the training of highly qualified professionals in higher education institutions and faculties is very large. Pedagogical experience, knowledge and interactive methods provide students with in-depth knowledge and skills.

Modern technologies are a pedagogical process, as well as innovations and changes in the relationship and activities of teachers and students, and in the implementation of this process, mainly innovative methods are used fully and effectively.

Interactive methods are called collective thinking, that is, methods of pedagogical influence, which are an integral part of the educational content. The peculiarity of these methods is that they are carried out only through the joint work of teachers and students.

This process of cooperation has its own characteristics, which include:

- Encourage learners not to be neglected during the lesson, to think freely, to be creative and to explore;
- Ensuring the constant interest of students in the learning process;
- To strengthen the student's interest in learning independently, creatively approaching each issue;
- The organization of constant interaction between teacher and student.

## CONCLUSION AND FUTURE SCOPE

The problems of innovative and pedagogical technologies, teaching professors, practical researchers say that pedagogical technology is not only related to information technology, but also information technology, which should be used in the teaching process, distance learning. On a pedagogical basis, the technologies chosen by the teacher and the student play an important role in the joint achievement of the guaranteed result from the set goal, that is, each educational technology used in the teaching process to achieve a guaranteed result on the goal can develop collaborative activities between teacher and student, can achieve the expected positive result for both parties, can think freely in the

learning process, can work creatively, can search, analyze and synthesize if they can draw their own conclusions, if they can make self-assessments, if the teacher can create opportunities and conditions for such activities, then these are the main links in the teaching process. Each topic, lesson, has a unique technology of the learning process, that is, pedagogical technology in the learning process is an individual process, which is focused on one goal, based on the needs and requirements of students, is a pedagogical process aimed at giving a pre-planned and guaranteed result.

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# GENERAL THEORY OF LINGUISTIC VARIATION

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## ABSTRACT

*At this stage in the development of linguistics, a special place is occupied by the theory of variability, which for a long time has attracted the close attention of linguists. In order to understand the principles of development of diachrony and synchronicity of the functioning of the language, it is necessary to understand the deep and comprehensive study of variance. In the last decade, the subject of interest of most linguists is the problem of variance and variability, and in theoretical terms it has not yet been studied.*

**KEY WORDS AND EXPRESSIONS:** *variance, variability, variant / invariant, language functioning, linguistic units, synchronicity and diachrony.*

## INTRODUCTION

The aim of this study is the theory of variability and its functioning in the modern Russian language. At each stage of the existence of a language, there are elements in it that are generated and die off, the diversity of which leads to the appearance of variance of linguistic units. Thus, variance serves for synchrony and diachrony and maintains continuity in the development of the language system.

At the present stage of the development of linguistics, variance occupies a special place, since one of the most important problems of linguistic variance remains. According to K. Aymermacher, "Variations are characteristic of any level of language at any stage of its development. It can be proved that it is variation that acts as a form of connection between synchrony and diachrony, since the unity of synchrony and diachrony manifests itself at any given moment in the variability of linguistic elements" [1, p. 4]. A.D. Travkina argues that the

term "variation" should be used to denote the phenomenon or concept itself, and "variability" - to the results of the action of this process [4, p. 78].

## DISSCUSION

A number of scholars (O. B. Sirotnina, N.N. Semenyuk, F.P. Filin) consider variability from the standpoint of formal variation, variation of the plan of expression with the identity (proximity) of the content plan. Linguists distinguish broad and narrow interpretations of variance [3, p. 63-64]. In their understanding, variability in a broad sense represents inconsistency in meaning and modification. Opposing a variant to an invariant does not find its necessity at this stage. Synchrony in the narrow sense of variability is a characteristic of the way of existence and functioning of language units. A dichotomy is characterized by the quality of abstraction abstracted from a specific linguistic unit.

Likewise, the phenomenon of linguistic variance (variation) is defined in science as "a



difference in reproduction, consisting in changing the sound composition or meaning of a structural unit of language without losing its identity" [1, p. 72]. Based on the foregoing, linguistic variance reveals a certain modification that does not lead to the emergence of something new, but, according to V.M. Solntseva, "assumes both variability and constancy, acting as a unity of changeable and constant" [2, p. 32]. Linguistic variants are "different manifestations of the same essence, for example, a modification of the same unit, which remains by itself with all changes" [2, p. 32]. in the language system they belong to one of certain tiers. In recent years, variant units have been described in the aspect of intercultural communication. - phonetic, morphological, syntactic, lexical, which to a large extent determines the total composition of variant units as means of expression, similarly compared with the designated.

Variation (variance) is one of the most general concepts in linguistics, thereby providing an opportunity to study it both in terms of studying the language system, and in terms of using specific variant units. In this regard, N.M. Solntsev states: "In linguistics, the concept of variability (variance) is used in two ways. First, as a characteristic of any linguistic variability, modification that may be the result of evolution, the use of different means of language to denote similar or the same phenomena, or the result of other reasons. With this understanding, there is no need for the division of variance-invariance. Secondly, the concept of variability is used as a characteristic of the way of existence and functioning of language units in synchrony, acting against the background of the concept of invariance" [2, p. 32].

The difference between the two terms has led to the fact that at this stage of the development of linguistics there is an opinion about the need to distinguish between the terms "variability" and "variance". So, in our opinion, these terms are used differentially: to the first term, the variation of the language system, denoted by the term "variability", and to the second meaning, the variation of language units, denoted by the term "variance". Thus, variance, as opposed to variability, can be viewed as a rapidly developing dynamics and process of language change, and variance as a result of these rapidly developing dynamic changes that manifest themselves in the language system itself and find their place in the existence of variants. This approach is considered to be completely proven, since the very existence of two understandings of variability allows its two-fold terminological labeling.

During the functioning of the language and the transition from language to speech, the problem of variance arises, as well as, if necessary, explain the different meanings of the same variant units in linguistics. In this regard, the above may not use all

the cases when there is a need for attention to the term variability, but is considered the most relevant and frequently used.

When we study literary texts, as well as colloquial speech, it gives us reason to believe that variance is considered in all aspects of linguistics. So, for example, we consider variance from the point of view of a literary text in a phrase, expressing attributive meanings, which contain a wide variability if they find their state in various adjacent forms. These meanings are constantly used by different means, distributed between different verbs, but they can be carried out with the same verb. Variation can come in three forms from the point of view of formal organization. In the first case, variable relationships can enter into an unlimited, reliable form and form with an excuse (work a month - for a month, read at night - at night, repeat the fifth time - for the fifth time, achieve something by persistence - thanks to persistence), and in the second in the case of reliable forms with pretexts (to sit at the table - at the table, to be silent at lunch - during lunch - during lunch, walk from a kilometer - about a kilometer) and in the third case, a reliable form and infinitive (come to dinner - by lunchtime - for lunch, rush to help - help, get tired of waiting - from waiting). In the information field of the younger generation, variance is manifested in the need to shorten words due to rapidly changing means of communication, for example: (advertisement - ad, comfortable - comfy, promotion - promo, substitute - sub, underwear - undies).

## CONCLUSION

In conclusion, variability and variance are continuously evolving phenomena and require constant attention from linguists to maintain and develop the freshness of the language. Thus, variance is a continuous process of dynamic changes in the language, reflected in the language system and manifested in the presence of certain variants of the language, and the concept of variability usually shows the presence of the ability to change the type of units, and linguistic expression is most fully manifested in linguistic activity and thus we can say that variance is already fixed in the language, while variability has a potential driving force that constantly lives and causes certain linguistic changes.

The emergence of variability, therefore, is due to several factors of human thinking, and one of them, of course, is due to the fact that the younger generation strives to reduce complex words by replacing the simplest units in communication, both in writing and in colloquial speech.



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# EFFECT OF FES ON ARM MOVEMENT AND HAND FUNCTION IN TRAUMATIC BRAIN INJURY SURVIVORS

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## ABSTRACT

**BACKGROUND:** Traumatic brain injury is defined as damage to the brain resulting from external mechanical force, such as rapid acceleration or deceleration impact, blast waves, or penetration by a projectile, leading to temporary or permanent impairment of brain function. Traumatic brain injury (TBI) has a dramatic impact on the health of the nation: it accounts for 15–20% of deaths in people aged 5–35 yr old, and is responsible for 1% of all adult deaths.

**OBJECTIVE:** This thesis examined the effect of arm movement and hand function through application of both FES and conventional therapy in Traumatic brain injury survivors.

**DESIGN:** Pre test/post test experimental design

**SETTING:** Occupational Therapy department, Swami Vivekananda National Institute of rehabilitation Training and Research, Olatpur, Odisha, 754010

**PARTICIPANTS:** 20 Traumatic brain injury survivors. (11 right handed and 9 left handed)

**INTERVENTION:** Subjects were collected from department of Occupational Therapy, SVNIRTAR. Parents of subjects was explained about the study and informed consent was taken from them. Baseline data were collected for all subjects by using Jebsen taylor hand function test, The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire. Before beginning the intervention each subjects were randomly divided into two groups as Group A and Group B. Subjects of both groups were provided therapy sessions for 45 minutes per day, 5 days in a week for 6 weeks..

## OUTCOME MEASURE

- Jebsen taylor hand function test. {JTHFT}
- The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire



**RESULT:** The results revealed that functional electrical stimulation (FES) produced a moderate mean treatment effect ( $p=0.05$ ;  $U=0.023$ ; 95% confidence interval: 0.05 to 0.91). Both the group shows the significant value where as functional electrical stimulation (FES) and conventional therapy comebinly showed better result than the functional electrical stimulation (FES) alone.

**CONCLUSION:** In conclusion, the most attractive feature of multichannel surface stimulators is that they are non-invasive, often programmable and allow for various muscles/muscle groups to be stimulated simultaneously in physiological patterns. They have a high level of fidelity and are able to produce global upper-limb motions as well as fine finger movements like two pinch grip (thumb and index finger) and tripod grip (thumb, index, and middle finger) using surface stimulation electrodes.

**KEYWORDS:** FES, TBI, Hemiparesia, transcutaneous, JTHFT, DASH

## INTRODUCTION

Traumatic brain injury is defined as damage to the brain resulting from external mechanical force, such as rapid acceleration or deceleration impact, blast waves, or penetration by a projectile, leading to temporary or permanent impairment of brain function. Traumatic brain injury (TBI) has a dramatic impact on the health of the nation: it accounts for 15–20% of deaths in people aged 5–35 yr old, and is responsible for 1% of all adult deaths. TBI is a major cause of death and disability worldwide, especially in children and young adults. Males sustain traumatic brain injuries more frequently than do females.

Traumatic brain injury (TBI) is one of the most common neurologic disorders causing disability, and motor weakness is one of the main sequel, along with cognitive dysfunction and behavior problems. Elucidation of the cause of motor weakness is necessary for successful rehabilitation in TBI; this information enables establishment of scientific rehabilitative strategies, estimation of the rehabilitative period, and prediction of final outcome for patients with TBI.<sup>1,6,8-17</sup>

Many studies have attempted to elucidate the causes of motor weakness in patients with TBI; various methods have been used, including clinical manifestation, brain computed tomography, conventional brain magnetic resonance imaging, or transcranial magnetic stimulation.<sup>1,8-11,18-20</sup> Most of these studies have focused on the specific cause of motor weakness.<sup>8-11,19,20</sup> However, little is known about the classification and elucidation of the causes of motor weakness in consecutive patients with TBI.<sup>1</sup> In addition, many difficulties have been encountered in the attempt to elucidate the exact causes of motor weakness because tools for use in evaluation are limited in that they do not allow for estimation and visualization of neural tracts 3-dimensionally.

The probability and rate of recovery of upper extremity motor function in rehabilitation patients with arm paresis after TBI was closely tied to the initial level of impairment and overall injury severity. The use

of wrist stretching exercises with protocol with four-week duration performed in adult population with hemiparesia from Encephalic Vascular Accident and extensive area Encephalic Vascular Accident, such as brain injury, incapable of actively extending the affected wrist putting it in neutral position, the maximum degree of extension was kept after the four week period compared to the control group, which performed only conventional rehabilitation without stretching of wrist and fingers, which reduced this amplitude a little, but was not significant ( $p < 0.09$ ). After four weeks of intervention there was improvement in the activity of the limb on the experimental group and it remained the same in the control group, but the difference also was not significant ( $p = 0.10$ ); both groups maintained similar responses to the first assessment in the fifth week, without performing stretching exercises, and in the ninth week with the resuming of the stretching exercises on both groups; no improvements were observed either in the level of pain, in none of the groups along the whole period of intervention.

Application of functional electrical stimulation (FES) for therapeutic purposes in rehabilitation settings dates back to the 1960's when Liberson et al. (1961) used an FES system to stimulate the peroneal nerve to correct foot drop by triggering a foot switch, a single-channel electrical stimulation device stimulated the common peroneal nerve via a surface electrode, producing ankle dorsiflexion during the swing phase of gait (Liberson et al., 1961).

Over the years, various grasping protocols have been identified and designed allowing for a wide variety of grasping patterns to be trained with a great deal of fidelity. Currently, the grasping patterns that can be successfully retrained using a transcutaneous multi-channel FES

The FES protocol allowed for individuals with little to no voluntary movement at the wrist and fingers to be able to perform simple tasks while being stimulated with the FES. This is what differentiates FES from other therapies. In the early stages of FES



therapy, all the movements were performed with the help of FES. The treatment plan and instruction to participants were as follows:

(1) “Imagine hand opening” (or any movement that the therapist would like to train).

(2) “Try to perform the movement using your own muscle strength.”

(3) After trying for about 10 s: “Now, try to perform the movement with the help of FES.”

Hence, emphasis was put on participants voluntarily attempting the movement while being stimulated with the FES. During therapy when the participants started showing an ability to voluntarily contract certain muscle groups FES for those muscle groups was reduced to a minimum and gradually withdrawn completely. The available channel was then used on other muscle groups that were still weak and needed to be trained. The order in which muscle groups were sequentially “reactivated” was subject-dependent. FES was always delivered while the participants were performing functional tasks, such as grasping a mug, pouring water, holding a pen, etc.

### AIMS AND OBJECTIVES

- To evaluate the effect of arm movement and hand function through application of both FES and conventional therapy in Traumatic brain injury survivors.
- To enhance arm movement and hand function through FES therapy alone.

### ALTERNATE HYPOTHESIS

- Both the FES and conventional therapy show significant result in recovery of hand function with Traumatic brain injury survivors.

### NULL HYPOTHESIS

- There will be no effect of both therapies in recovery of hand function in Traumatic brain injury patients.

### METHODOLOGY

#### PLACE OF STUDY

The study was conducted at Swami Vivekananda National Institute Of Rehabilitation training and Research, Cuttack Orissa.

**STUDY DESIGN:** Pre test / Post test experimental design

**SAMPLE SIZE:** 20 Traumatic brain injury survivors.(11 right handed and 9 left handed)

**Group A-10**, was taken in FES and **Group B-10** in (FES) and conventional therapy group.

### INCLUSION CRITERIA

- Time post injury: >12 Months
- Moderate to severe TBI, with one of the following (as confirmed by medical records):
  1. Post-traumatic amnesia for over 24 hours
  2. Trauma-related intracranial neuroimaging abnormalities (based on radiology reports of the head CT scan acquired acutely)
  3. Loss of consciousness for over 30 minutes
  4. Score of over 13 on the Glasgow Coma Scale (recorded in emergency dept, but not valid if patient was incubated, sedated or intoxicated)
- Has emerged from post-traumatic amnesia (as indicated by review of medical history documents)
- Cognitively oriented (score above 23 on the Mini Mental State Examination)
- One upper limb is more affected than the other, and participant reports impaired upper limb function because of the more affected limb
- The more affected limb is at Stage 3, 4 or 5 of Arm Recovery

### EXCLUSION CRITERIA

- < 18 years old at the time of injury
- A history of previous neurological disorder
- A history of significant psychiatric disorder
- The more affected limb is at the Stage 1, 2, 6, or 7 of Arm Recovery
- Pain in the upper extremity during the upper limb function screening
- Active subluxation of the shoulders (i.e., the glenohumeral joint)
- Undergoing treatment for spasticity in the upper limb (e.g. botulinum toxin injection)

### OUTCOME MEASURE

- Jebsen taylor hand function test. {JTHFT}
- The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire

### PROCEDURE

- Subjects were collected from department of Occupational Therapy, SVNIRTAR. Parents of subjects was explained about the study and informed consent were taken from them. Baseline data were collected for all subjects by using Jebsen taylor hand function test, The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire. Before beginning the intervention each subjects were randomly divided into two groups as Group A and Group B. Subjects of both



groups were provided therapy sessions for 45 minutes per day, 5 days in a week for 6 weeks. The subjects of Group A had received FES Therapy for 45 minutes. Whereas subjects in Group B had received FES with conventional Occupational Therapy for 45 minutes. At the end of 6 weeks, all the subjects were administered Jebsen Taylor hand function test, The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire. were collected as pre and post intervention data. Both pre and post data will be taken for statistical analysis.

**Group A (FES):** The FES training was implemented once a day for 45 minutes from Monday to Friday for four weeks. Each training consisted of three sessions with five minute breaks between two sessions. Each session was performed by an appropriate position, followed by explanation of rules and instructions by the therapist. The stimulation parameters used were the following: (a) balanced, biphasic, current regulated electrical pulses; (b) pulse amplitude from 8 to 50 mA (typical values 15–30 mA); (c) pulse width 250  $\mu$ s; and (d) pulse frequency 40 Hz (During the intervention, the therapist, at their discretion, adjusted the placement of electrodes and guided the hand movements. The therapist ensured that the movements were functional.

**Group B (FES and Conventional therapy):** The subject received the following instructions before each session: during this session there are some activities including flexion/extension of the thumb, abduction/adduction of all digits, making a fist/spreading the hand, moving extended fingers backwards and forwards, and moving the hand

between the ulnar and radial deviation. Over the years, various grasping protocols have been identified and designed allowing for a wide variety of grasping patterns to be trained with a great deal of fidelity. Currently, the grasping patterns that can be successfully retrained using a transcutaneous multi-channel FES system are:

- (1) Palmar Grasp (holding a ball)
- (2) Lateral Grasp (holding a tray)
- (3) Tripod grip (thumb, index, and middle finger: holding a pen)
- (4) Two finger opposition (thumb and index finger: holding a peg)
- (5) Lateral Pinch (thumb and index finger: holding a credit card)
- (6) Two finger lateral pinch (index and middle finger: smoker's grip)
- (7) Lumbrical grip (all four fingers with the thumb: holding a closed book).

## DATA ANALYSIS

After collecting all the data, data analysis were done by using SPSS version 23.0.

Mann Whitney U test were used to analyze the changes in scores Jebsen Taylor hand function test, The disabilities of the arm, shoulder and hand (DASH) outcome questionnaire. between group and Wilcoxon signed rank test was used to analyse the changes within the groups. Level of significance was set at  $p \leq 0.05$ .

## RESULTS

The analysis of data gives the following tables showing the demographic characteristic and test results.

**TABLE 1 SHOWS DEMOGRAPHIC CHARACTERISTICS OF SUBJECTS**

SL NO.	BASELINE CHARACTERISTICS	GR. A	GR B
1	No. of subjects	10	10
2	Age range (years)	25-45	25-45
3	Mean age	34.9 years	35.36 years

**TABLE 2 SHOWS DESCRIPTIVE STATISTICS OF OUTCOME MEASURE :**

OUTCOME MEASURE	GROUP A				GROUP B			
	Mean test score		Standard deviation		Mean test score		Standard deviation	
	Pre test	Post test	Pre test	Post test	Pre test	Post test	Pre test	Post test
DASH	71.83	58.64	$\pm 7.21$	$\pm 7.81$	70.87	43.37	$\pm 5.55$	$\pm 5.21$
JTHFT	33.86	28.53	$\pm 3.97$	$\pm 6.18$	32.94	21.53	$\pm 3.24$	$\pm 3.73$

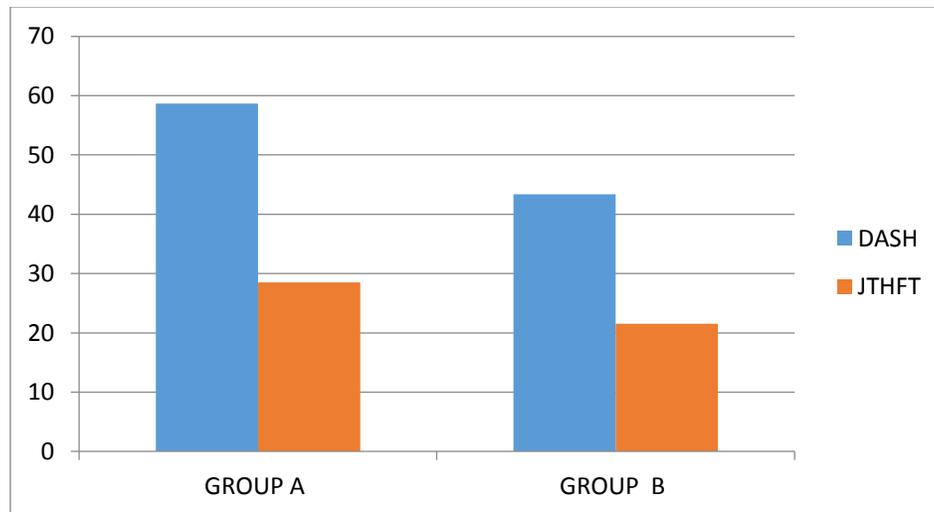


**TABLE 3 SHOWS DESCRIPTIVE STATISTICS OF WITHIN THE GROUPS  
OUTCOME MEASURE:**

OUTCOME MEASURE	GROUP A	GROUP B		
	<b>Mean test score Standard deviation</b>	<b>Mean test score Standard deviation</b>	<b>W</b>	<b>P</b>
DASH	71.83±7.21	70.87±5.55	11.32	<b>0.54</b>
JTHFT	33.86±3.97	32.94±3.24	9.78	

**TABLE 4 SHOWS DESCRIPTIVE STATISTICS OF BETWEEN THE GROUPS.  
OUTCOME MEASURE:**

OUTCOME MEASURE	GROUP A	GROUP B		
	<b>Mean test score Standard deviation</b>	<b>Mean test score Standard deviation</b>	<b>U</b>	<b>P</b>
DASH	58.64±7.81	43.37±5.21	13.6	<b>0.023</b>
JTHFT	28.53±6.18	21.53±3.73	8.98	



**DISCUSSION**

Current study presents there was improvement in hand function in both the group. In sub acute stage FES is not beneficial unless physical practice was not there.

The degree of functional recovery of the upper extremity greatly affects the estimation and determination of the degree of assistance necessary to perform the activities of daily living and the level of independence after TBI. In particular, since many tasks in the activities of daily living required the use of the upper extremity, patients who cannot use their hands become to experience physical and mental pain. TBI patients with serious upper extremity paralysis sometimes show repulsion against physical approaches

focused on the recovery of paretic extremity functions [Blanton & Wolf, 1999], and this phenomenon sometimes becomes a secondary problem in achieving efficient recovery processes.

Short duration multichannel surface FES is a viable and safe treatment modality that can be successfully applied in patients with neurological conditions. It is important to note that we did not formally investigate safety and feasibility in our clinical trials mainly because transcutaneous FES has been applied in clinical trials for over 5 decades now without any reports of major adverse events.

Basic principles of FES application on the widely accepted belief that mechanism of improvement with this therapy is based on the principles of



neuroplasticity (Nagai et al., 2016). First and foremost it is strongly recommended that therapy should be started as soon as the medical condition of the patient is stabilized, i.e., preferably in the acute or sub-acute phase post-injury. Secondly, active participation of the patient during treatment is critical. Along with the FES, patients have to make an active attempt to execute the target movement. Third, the movements carried out should be functional and should follow a physiological pattern as closely as possible (movements similar to those of able-bodied individuals). Fourth, therapy should be combined with conventional rehabilitation modalities (example: stretching and strengthening) to reap maximum benefits. Lastly, while no specific dosing study has been conducted,

All have recovered to mild or no paresis. In fact, a hand with no isolated movement by 2 weeks after stroke has a very small chance of recovery of isolated movements.<sup>19</sup> By comparison with stroke patients, although the average time course of recovery was comparable (6.9 weeks for patients with TBI in this study versus 7 weeks for patients with stroke), later recovery was more likely in patients with TBI. In one study of patients with stroke' maximal arm recovery was achieved by 9 weeks in 95% of the group, whereas more than 20% of patients with TBI in this study progressed to maximal recovery after 8 weeks.

## CONCLUSIONS

Arm paresis after TBI is relatively infrequent. Most patients recover by 2 months but later recovery is possible, especially in patients with primarily diffuse brain damage. Recovery is highly related to initial impairment, injury severity, and distribution of brain injury. In conclusion, the most attractive feature of multichannel surface stimulators is that they are non-invasive, often programmable and allow for various muscles/muscle groups to be stimulated simultaneously in physiological patterns. They have a high level of fidelity and are able to produce global upper-limb motions as well as fine finger movements like two pinch grip (thumb and index finger) and tripod grip (thumb, index, and middle finger) using surface stimulation electrodes.

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## REASONS OF NEW WORDS FORMATION IN YOUTH SOCIOLECT

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### ABSTRACT

*The article under discussion depicts reasons of new word formation in youth sociolect. The authors of the article consider that The world of slang does not stand still, it changes all the time. Youth slang easily absorbs words from different foreign languages, from different dialects, from criminal language. The development of modern slang is influenced not only by computerization. A large number of subcultures, informal movements, and simply large and small reference groups, as well as their rapid emergence and, often, subsequent extinction. All this also leaves a mark on slang diversity.*

**KEY WORDS:** *transformations, youth sociolect, borrowing, words, foreign, speech, linguistic forms, literary language, boundaries, replace, jargon.*

### DISCUSSION

Transformations in the economy and politics, the openness to international contacts in our time have led to the borrowing of words which have literally flooded into the Russian and Uzbek languages. Fair enough, if they denote phenomena and concepts which we did not have. But often the verbal invasions simply replace the Russian and Uzbek ones. When you pick up a newspaper, your heart sinks as you see the linguistic intrusion in the form of words like "спичрайтер" - speechwriter, "лейбл" - label, "шоу" - show and others. By borrowing, the Russian and Uzbek languages are impoverished, and many wonderful linguistic forms are left unnecessary [1].

The bearers of youth slang are 12-25 year olds. Up to the age of 16-17, everyone is inseparable from school, and all problems are connected with it. You could say that school slang is the age-old language that everyone was exposed to when they

were in school. School slang includes names of school subjects, school grades, some school facilities, individual school staff members and learning activities. As we can see from school slang, the favorite way of forming new words is abbreviation of a word or cutting off its part: мафон – tape recorder, дискач – discotheque, днюха – birthday, чел - young man and others. The speech of young people is also rich in words - interjections, the origin of which is impossible to determine: «типа», «короче», «блин», «прикинь» and others.

The functions of youth slang are manifold. Firstly, it is a signifying and marking function, based on in-group conformity, group cohesion. It is a function of self-recognition, where a slang word is used to denote belonging to a given reference group. The masking function of student slang in particular is related to the problems of assimilation of former schoolchildren in the student environment.



Another function of youth slang is based on separating one group from another. It is based on out-group conformism, the opposability of the slang word. The bearer of a certain "subcultural" slang refuses to use a word replicated in other social groups.

The next function - creative is related to the fact that slang reflects realities which are not marked in literary language (additional connotation and denotation). Besides, it is a playful phenomenon, through which a speaker, a young person, lives and learns the language not only as a consumer, but also as a creator. Its exposure to a specific youth vocabulary helps it to realize - from the contrary - the composition, boundaries and functions of the codified literary language, to master a kind of "glossary", rejecting jargon in an official situation, in the classroom, in the university classroom [2].

Students themselves cite the desire to "compose" language for a small group as the reason they use jargon. Sometimes the student society specifically discusses the possibility of replacing literary expressions with other expressions invented in the group. Most turns of student jargon are based on a successful, witty comparison given by someone else. For example, a skinny person may be called "the tough guy from Buchenwald", "the bike hound", "the bicycle reached"; a skinny girl is referred to as "the pencil in the glass" (thin legs in boots resemble a pencil in a glass).

Other reasons for using slang words were noted: the special "romance" of the slang word, the opportunity to express one's creative abilities, the specificity of the slang expression. It is unusual in its sounding, sometimes sharp and apt. The shortest student answer is: "We say it to make it cooler".

Examining the reasons for the spread of slang among today's youth, it can be said that the main ones are:

#### 1. Development of computer technologies

Internet, rapidly developing computer technology has always attracted young people. In this regard, there are many new words - вирус - virus, инет - internet, смайлики - smile signs, геймер - gamer.

#### 2. Modern musical culture

One of the hobbies of young people is music, which is a mixture of different cultures, musical directions, the result of composer's experiments. Youth slang related to the sphere of music contains the names of different musical styles: поп - pop music; compositions: фреш - fresh, new music; names of actions of musicians: клик - play.

#### 3. Foreign language

In the speech of young people, words are used that are borrowed from English, but never translated into Russian. Interestingly, these slangisms are understood even by people who have never

learned English in their lives. Such slang words have become part of modern speech. (фифти-фифти - 50x50; респект - respect; лузер - loser; парти - party; фейс - face).

#### 4. Criminal vocabulary

Some young people think that using such vocabulary in speech makes them authoritative and exalted. So it is often heard from young people who are trying to be leaders in a company, a group. (Авторитет - authority; стучать - report; палить - to observe someone)

#### 5. Slangisms related to drugs, alcohol.

They are basically subdivided into words that are the name of a drug addict, names of drugs and words that denote actions related to drugs. (наркоша - drug addict; колёса - pills; нюхать - drug related activities).

Words related to alcohol can also be divided into small groups: синяк - alcoholic; дринкер - drinker.

#### 6. Computer games, videos, cartoons.

A lot of slang words come to the speech of young people from computer games, but most often these words are specific in use, they are used mainly by young people for whom the game - a hobby (Глюк/глючить - a mistake in the game; админ - a system administrator; айтишник - IT worker).

The most expressive, funny and memorable names of movie characters and cartoons go to the youth speech in the names of nominal.

Most of youngsters are fond of criminal TV series and watching the TV show "House-2", "Comedi - club", computer games, watching video bloggers on the Internet, which contribute to the active learning and further use of slang and profanity.

#### 7. Young people's hobbies and passions

Young people have various hobbies to which they devote their free time. And the world of slangisms associated with this or that hobby is bright and peculiar (дискач - a disco dancer; искать кобылу - to have a free time)

The development of modern slang is influenced not only by computerization. A large number of subcultures, informal movements, and simply large and small reference groups, as well as their rapid emergence and, often, subsequent extinction. All this also leaves a mark on slang diversity. The world of slang does not stand still, it changes all the time. But, of course, there is permanence. Such subcultures as punks, metal workers, rockers can be found quite often. They don't disappear anywhere. And many movements (such as emo, ska-punks, drammers) that appeared not so long ago have faded away, to see their representatives is almost impossible. The same situation is with the slang of these subcultures [3].



## CONCLUSION

Slang does not remain constant. As one fashionable phenomenon is replaced by another, old words are forgotten and replaced by new ones. The process is very rapid. While in any other slang a word can exist for decades, in youth slang an incredible number of words have appeared and gone down in history in just the past decade of rapid world progress.

But there are also some things that have not undergone much change. But their slang designations have not remained unchanged either. Generational change is underway and the words that seemed fashionable and funny five or seven years ago now look outdated. As fashions and social trends change, some words simply become boring.

There is also the problem of words changing from slang to normal. In most cases, slang words that are old and used become normal words. In this case, the word loses its eccentricity. Newspapers and magazines play an important role in this. Slang words appear in them in most cases because the normal words corresponding to them are inconvenient to use frequently, or are absent altogether. Magazines tend to use slang words in abundance, to create a more fun, youthful atmosphere. But from such entertainment magazines slang often moves to the pages of more serious periodicals, and sometimes - and scientific literature. Think for instance of the word "hardware", which for a time was strictly slang, but over time has become a professional lexicon. Now it can be found in any computer magazine. As we can see, youth slang is mostly English loanwords or phonetic associations, translation is less common and due to young people's active imagination. The involvement of foreign words in the language should always be treated with care, and all the more so when this process has such speed [1].

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## **SPEECH ACT OF DISAPPROVAL IN PEDAGOGICAL DISCOURSE**

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### **ABSTRACT**

*This article is devoted to analysis of speech acts of disapproval in the pedagogical discourse. The author of the article considers that in the pedagogical discourse, disapproval is the expression of a negative evaluation by a superior (i.e. teacher) in order to change the behaviour, performance, appearance, etc. of persons below (i.e. students). A distinctive feature of the pedagogical discourse is the desire for partnership, cooperation and demonstration of respect for students' personality, which explains the priority in choosing certain ways of disapproval.*

**KEY WORDS:** *pedagogical discourse; reproach; remark; reprimand; condemnation; warning; threat; criticism; negative evaluation; speech act; disapproval.*

### **DISCUSSION**

Most cultures have the notion that being polite in communication is an important aspect of creating good communication in order to show respect for others. However, when establishing communication and relationships with others, a mistake sometimes happens. The speaker may make a remark to others that he or she does not like or approve of his or her actions. Whenever the speaker makes a remark, he or she is not only making a statement, but also performing an action. In this respect, the utterance carries a high risk of interrupting the conversation.

The present study considers speech acts of disapproval as an expression of negative evaluation. According to L.R. Bezuglaya, speech acts of disapproval express a negative evaluation, which the speaker gives to the actions of another person, or what is happening around [3]. The general meaning of disapproval is subdivided into reproach, censure, condemn, accuse, etc. [8].

The pragmatic variety of functioning of speech acts of disapproval depends on the type of discourse - parameters of communicative situation. Thus, pedagogical discourse refers to the institutional discourse, which is carried out in certain communicative conditions, dictated by the format of professional pedagogical activity - the lesson. The

purpose of expressing speech acts of disapproval in pedagogical discourse is not to provoke negative emotions, like in conversational discourse, but to change behavior, so the speech should be constructed so as not to offend the opponent (the student in particular) and contribute to the correction of noticed shortcomings.

The concept of pedagogical discourse emerged in the 1970s and was described as a situational and socially conditioned speech activity. Due to the fact that pedagogical discourse processes take place in the educational environment of educational classes and the main goal of communicators has didactic orientation, such discourse is also called "didactic".

The problems of pedagogical/teaching-pedagogical discourse were studied by linguists V. Karasik, A. Gabidullina, T. Yezhova, M. Oleshkov, Y. Shcherbinina, etc. [5,6,7,8]. According to T. Yezhova's concept "pedagogical discourse is a dynamic system of value and meaningful communication of subjects of educational process which objectively exists and functions in educational environment. [5]. The components of this system are discourse participants, pedagogical goals, values and a semantic component which ensures that the subjects of the learning process gain experience in designing and evaluating pedagogical and social



phenomena". A.Gabidullina, using the term "educational-pedagogical discourse", defines this concept as a holistic social and communicative event in the sphere of organized learning activity, the essence of which is the interaction between a teacher and a student and which occurs within a specific educational and pedagogical situation with the help of texts and other sign complexes [6]. V.Karasik believes that pedagogical discourse is more structured due to the high level of regulation, status of participants, and ritualization. V.Karasik points to such a peculiarity of it as the presence of the discourse author (teacher) who is aware of the need to "generate" a text, is able to implement it in the form of his own didactic genre text, exercising planned influence on the addressee in a particular communication situation [8].

The general strategy of pedagogical discourse is an imperative strategy aimed at guiding all student activity in the classroom. It is implemented through specific tactics, the most important of which are the tactics of concentration, stimulation of physical and mental activity, establishing and maintaining verbal contact, and controlling student activity.

The imperative strategy at the initial stage of the lesson is implemented through the tactics of establishing verbal contact and enhancing mental activity. At the other stages (i.e. the explanatory or summarizing time) the task of the teacher is to stimulate pupils and students to be physically and mentally active, to make them work:

*Who will go to the blackboard?* indirect stimulus to action expressed by a questioning statement *Well/ go/ Zumrad, please// Let's remember the orthogram of vowels after the comma!* - a demand-ask addressed to a specific pupil and a call for joint action, addressed to the whole class.

The tactics of maintaining language contact within the framework of the communicative-regulative strategy are most often used in the course of the entire lesson through different kinds of remarks-evaluations by the teacher's *Behaviour in the lesson ugly// Guys// only Umid answers// Are yo // You're shouting //* Often these are negative assessments of pupils' work in class *Guys/It's already too much/they're all idlers// Well/ look/ they're sitting alone/ doing a hundred things at once/ we don't write anything/ we don't do anything/ everybody gets a bad mark//* These emotionally charged reprimands contain a strongly negative assessment of pupils' actions and even a threat.

The teacher's speech is composed of stereotypical teacher statements. The most frequent are prompts forms of prompting depend largely on the age of students, on the types and stages of lessons, on the personality of the teacher (authoritarian, democratic), on the psychological type

of class, on the type of speech culture of the teacher. So, for example, in upper grades prompting at the beginning of the lesson may be expressed by imperative form of the imperative inclination, But this is softened by etiquette such as: *Please open your exercise book and write down the topic//* Often collective action forms are used which soften the degree of inequality and authoritarianism of the teacher. *We write down// We stress the spelling// We solve equations// We start putting things in square//* Also, the teacher uses indirect inducements by asking pupils *When do we put a semicolon?//* There are always lots of these questions in the lesson and the teacher uses them to stimulate the pupils into a mental procedure. The teacher also uses implicit forms of prompting *How do we check?// Do we check the prefix "pre" in any way?// No// We need to remember what it means // So/ What does it mean?//*

The teacher constantly gives feedback to pupils in class using the evaluative genre of 'pedagogical feedback'. These can be stereotypical pedagogical remarks or extended reprimands. Such remarks are directed at both physical actions and pupils' intellect *Anton, what happened to you? // Sit and sleep// Wake up, work//* - the teacher rebukes the pupil for being passive and at the same time encourages him/her to be active *Quietly, Aziz/ You are not clever/ Look carefully at the textbook//* - a rebuke to the pupil for being careless.

The speech acts of rebuke can be grammatically realized through modal verbs.

The lexico-syntactic model of rebuke expression is as follows:  
Subject + could/might/should + Perfect Infinitive [10; 11].

In example 1, the teacher rebukes the pupil for not having read the school uniform rules.

1) Teacher: *We have a strict black-shoe policy here, Munira. Your parents should have read it in the introductory rule book, page 142.*

The modal verb "should" in combination with the infinitive in the perfect form expresses a rebuke about something that should have been done (reading the school rules) but has not been done.

The prevalence of the speech acts of reproach in comparison with other speech acts with the disapproval semantics is due to the fact that the speech acts of reproach is characterized by the situation of positive and constructive cooperation in problem solving and by the equivalence of the positions of speaker and listener [12], which is characteristic for the pedagogical discourse, where the teacher strives for informal communication.

In example 2, during the exam, the pupil watches what the other pupil is doing.

2) Teacher: *Eyes forward, Anna.*

The imperative construction is expressed without a verb, using the preposition forward. The



teacher uses a short sentence to correct a behaviour in which she disapproves of a pupil's peeping during a test.

In contrast to a correctional remark, a reprimand most often involves an extended expression of disapproval.

In example 3 the teacher disapproves of an article that the student has written for the school newspaper.

3) Teacher: *I can't run this story, Salim. It's against every rule here, and your dad is on the board.*

The inconsistency of the article with the school rules is expressed by the phrase *"is against every rule here"*, where the negation is expressed by the preposition *against*, which has a negative semantics - "disagreeing with a plan or activity" [17]. The combination of the preposition *against* and the intensifier *every* strengthens the categorical nature of the utterance. A phrase with the modal verb *can't* indicates the impossibility of publishing an article [18].

In example 4, the principal summoned a student to express his dissatisfaction with the film he had made about the students.

4) Teacher: *Peddling this kind of trash makes you reprehensible. Do you know what "reprehensible" means?*

Student: *Yes, sir.*

In this example there are two evaluation words with negative semantics: *trash* and *reprehensible*. The director calls the film "trash" - "something that is of low quality". For condemnations it is important that actions are bad and that the negative evaluation is given by the author based on his/her own subjective perceptions of bad and good [5]. The presence of the speaker's subjective assessment distinguishes censure from condemnation. In addition, it is the actions that are censured, not the person himself or herself. In this example, the principal refers to the pupil making his/her *reprehensible*, referring the negative quality to the pupil's personality, where *reprehensible* means "very bad".

Thus, in the pedagogical discourse, disapproval is the expression of a negative evaluation by a superior (i.e. teacher) in order to change the behaviour, performance, appearance, etc. of persons below (i.e. students). A distinctive feature of the pedagogical discourse is the desire for partnership, cooperation and demonstration of respect for students' personality, which explains the priority in choosing certain ways of disapproval. Thus, the results of the study showed that the pragmatics of acts of speech of disapproval is multifunctional, with the pragmatic meanings of reproach and remark-correction characterizing the mentality and culture of teachers.

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## PROBLEMS ENCOUNTERED IN STUDYING THE RUSSIAN LANGUAGE

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### ABSTRACT

*The article under discussion depicts analysis of difficulties and typical mistakes of the Uzbek students when studying Russian as a foreign language. The main difficulties of studying the Russian language caused by an interlingual interference, connected with the influence of graphic, phonetic, grammatical features of the Uzbek language. The author describes the typical spelling and grammatical errors capable to create serious barriers in the course of communication with native speakers of Russian.*

**KEY WORDS:** *Russian as a foreign language, communicative skills, the Uzbek students, interlingual interference, orthographical mistakes, grammatical mistakes, professionally focused training.*

### DISCUSSION

The issue of teaching Russian is quite complex. In Russian lessons, the student's mental activity should be stimulated and supported. The Russian language should be taught on the basis of texts, not only rules. Practice shows that, knowing the rule, the student often fails to use it in the text [2].

Particular attention should be paid to the linguistic difficulties that Uzbek students encounter in the field of phonetics, grammar and orthography. They are mainly due to the significant differences in the systems of the studied Russian and the native Uzbek language, which belongs to the Turkic group. Besides, Latin script, which is quite mastered by the young Uzbek generation, creates additional difficulties in reading and writing in Russian at the initial stage. For example, students often read the Russian "r" as [p], the handwritten "t" as [m]. In writing, it is not uncommon for students to write "i" instead of "u" (подимайте), "v" instead of "b" (выли, вить). Such mistakes are usually eliminated through a lot of training, reading and writing exercises.

Teaching Uzbek students to pronounce sounds and sound combinations correctly in Russian is a complicated task. It should be remembered that correcting incorrect pronunciation is more difficult than immediately teaching them how to pronounce the sounds correctly from the moment they start learning Russian.

Special phonetic exercises are an effective method of helping to consolidate the skills of correct Russian pronunciation. Under phonetic exercises we propose training in listening (perception) and pronunciation (reproduction) of Russian sounds that are difficult for Uzbek students.

The phonetics of the Russian language constantly needs to be practiced during the learning process. Particular attention is needed for words with sizzling [ш], [щ], [ж]. Listeners often make mistakes in words with these letters: ковришка, женщин, курящий, помощник, шили, младшего, куцат, etc. A number of exercises should be aimed at distinguishing the letters ш - щ when reading and writing, because the Uzbek students confuse them (the use of the present and past participles of пишущий - писавший). The hard pronunciation of [zh] in the words жизнь, живот etc. requires training.

Listening has been shown to be effective in solving a variety of phonetic and orthoepic problems. "It is advisable to teach listening in RLI classes with the involvement of interesting professionally relevant audio texts for students through the gradual introduction of difficulties related to the language form, content of the message, the conditions of its presentation and sources of information". [3].

A very common mistake made by Uzbek students is to spell words with a soft sign. Especially common mistakes are made in words where the soft sign is in the middle of the word (ночью instead of



ночью, серьезной instead of серьезной, стуля instead of стулья, пють instead of пьют, etc.), less frequent are mistakes in writing words with the soft sign at the end of the word (звер, медвед, огон, пит, рассказат). This is explained by the fact that there is no such letter in the Uzbek alphabet. The teacher shall explain the main cases of using the soft sign in the middle of a word, at the end of nouns and verbs and usually list the grammatical forms where it is absent. The verb combinations -ться, -тся are practically not distinguished between students and with the -ца of nouns: mispronunciations such as учица (instead of учится), преподавательнится (instead of преподавательница), улица (instead of улица), полотенсе (instead of полотенце).

At the first stage, it is also of great importance to study Russian morphology in parallel with other aspects. Particular attention should be paid to the gender category, as this grammatical category is completely absent in Uzbek. Names of males and females and of some animals are only lexical-semantic and have no grammatical meaning of gender. It has no effect either on declension or on the case suffixes of these nouns.

That is why, when nouns are used, mistakes are often made in concordance, for example, masculine and feminine in -ль, and mistakes in gender determination are also common, including comical mistakes from the Russian point of view, for example, when a boy says я родилась, and a girl says я родился. Corresponding mistakes occur in the use of adjectival lexemes, which in Russian require obligatory agreement by gender with the definite word and are semantically dependent on the nouns they define [2].

Russian prepositions used with certain cases also cause difficulties foreign students from Uzbekistan (mistakes such as на больнице, в рынке, вы сейчас на университете, привезла на деканат etc.)

In the Russian verb system for Uzbek students, as well as for other non-native speakers, notions of the form [10], infinitive, and imperative inclination are very problematic, as these grammatical phenomena are absent in their native Uzbek language, as well as cases of the use of verbs of motion [1]. The students have difficulties in comprehending these linguistic phenomena and make numerous mistakes in the use of these verbal forms in their speech. Even if the students cope with such tasks during control, many of them make mistakes when incorporating them into the text and their own speech (Я медленно ходил домой. Потом я опять начинал ходить дальше).

In the field of syntax, the Russian language teacher should focus on such types of links in Russian as agreement and control. Since Uzbek is

agglutinative, whereas Russian is inflective, these syntactic links are poorly mastered by the students. This problem can be solved not only through reproductive exercises but also through creative tasks which stimulate the production of independent statements by the learners. Such traditional forms of written work as essays and essays are very effective.

Constant work on the spelling of the Russian language must be carried out in the classroom. The discrepancy between the written and spoken word generates a large number of errors. The analysis of the written work of Uzbek students shows the predominance of this kind of errors over all others for obvious reasons (узкий, позно, спасибо, счастливый, мягкий, мяккий, дастают, похучие, трапинке, ийти, духофки, приставте, поемите, etc.).

Scientific style of speech, language of speciality shall also be introduced as early when studying Russian as a foreign language, a future student gets acquainted with lexicon and terminology of special disciplines, complicated grammatical constructions of book language. As it is known, the Russian language of professional communication has peculiarities characteristic of this sphere [4].

Thus, the experience of working as the Russian language teacher has shown that the main difficulties for Uzbek students in mastering the Russian language and their communicative mistakes are related primarily to the mismatch of the two language systems, the absence of a number of grammatical phenomena in the native language of students, with which they constantly unconsciously correlate the language material they are acquiring on an intuitive level. "Cultural archetypes are deep attitudes of the collective unconscious, so people, as a rule, are not aware of their ethno-cultural archetypes, which "work" to preserve the cultural genotype of this or that nation. Cultural archetypes are evident in all spheres of human life, but most of all they are manifested in their everyday life" [6]. Taking into account the above features of the Uzbek language and culture in comparison with the Russian linguistic culture will allow working productively on the elimination of errors in the speech of Uzbek students.

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# CLASSIFICATION OF FEASIBILITY OF BASIC FOOD RECIPIENTS IN KELURAHAN TANJUNG MORAWA A, TANJUNG MORAWA SUB-DISTRICT USING NAÏVE BAYES CLASSIFIER ALGORITHM

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## ABSTRACT

*In the era of globalization, information technology is developing so rapidly. Computers are tools made to facilitate human work. Village officials need a system that can support performance and provide better services to residents. The COVID-19 pandemic affects various aspects of life, including economic aspects, at the global level. The performance of most industrial sectors has decreased. In 2005, the Direct Cash Assistance (BLT) program was introduced as a substitute for fuel subsidies. To reduce the negative impact of the COVID-19 pandemic on the economy, the government through the Ministry of Social Affairs has implemented various social assistance programs such as an increase in the number of aid recipients in the Family Hope Program, non-cash assistance programs or the Basic Food Program with an expansion of the number of recipients from 500 thousand to 900 thousand families. Poverty is one of the critical issues in every world that has been the subject of political concern. Poverty is one of the issues that many developed countries, including Indonesia, have faced. Naïve Bayes is a basic classification of probabilities that calculates a series of probabilities by adding the frequencies and value combinations from the given dataset, so the solution developed to overcome the problems.*

**KEYWORDS:** Covid-19, poverty, Algoritma Naïve Bayes Classifier

## A. INTRODUCTION

The COVID-19 pandemic is affecting various aspects of life, including economic aspects, at the global level. The performance of most industrial sectors has decreased. MSMEs, especially in the tourism and retail sectors have experienced a significant negative impact. People's purchasing power has also decreased, along with the sluggish economy. To reduce the negative impact of the COVID-19 pandemic on the national economy, the Indonesian government has implemented several programs to strengthen social protection and economic stimulus, including: Family Hope Program (PKH), Pre-Work Cards, Social Assistance, Micro and Ultra Micro MSME Stimulus, and reduced electricity rates. Most of these programs are programs that have been routinely carried out by the government. In connection with COVID-19, the

government has since increased the number of beneficiaries of the programs previously mentioned. Since being implemented for the first time in the 1990s, the government's social assistance programs for communities have undergone various forms of change and reached more beneficiaries. In 2005, the Direct Cash Assistance (BLT) program was introduced as a substitute for fuel subsidies. To reduce the negative impact of the COVID-19 pandemic on the economy, the government through the Ministry of Social Affairs has implemented various social assistance programs such as an increase in the number of aid recipients in the Family Hope Program, non-cash assistance programs or the Basic Food Program with an expansion of the number of recipients from 500 thousand to 900 thousand families (source: *PowerPoint Presentation (sumutprov.go.id)*).



The results of studies conducted so far show that the implementation of the government social assistance program, especially in the aspect of its distribution, faces several challenges, such as (a) disbursing funds to the right beneficiaries; (b) the distribution of the appropriate amount and amount of aid; and (c) program duration. To support the effectiveness of the distribution of government social assistance programs, the Directorate General of Population and Civil Registration (Dirjen Dukcapil) of the Ministry of Home Affairs in collaboration with local governments (PEMDA) continues to improve the accuracy of aid recipient status. Through the Integrated Social Welfare Data (DTKS), which is the database used for the distribution of social assistance nationally, the Director-General of Population and Civil Registration matches his population data based on the Identification Number (NIK), with recipients of assistance at DTKS based on NIK, so that distribution is believed right on target.

Previous study was carried out using one of the Fuzzy MADM methods, namely Simple Additive Weighting, to identify recipients of non-cash food assistance (SAW). This method was selected because, from many possible alternatives, it was able to choose the best alternative. The findings obtained for this approach from the experimental simulation are sufficiently optimal to justify the decision-making that person B is poorer than person A and C, and the outcome is that priority is given to person B to get assistance.

This study aims to compare and evaluate the classification algorithm that generates the most accurate precision that will later be used to create a system that will help predict and determine the Naive Bayes method's feasibility. Compared to other classification methods in terms of accuracy and computational efficiency, it is also considered to be theoretically effective at classifying data. The system application that will be designed will use the Visual Basic programming language, where this application can make it easier to determine/classify the eligibility of foodstuff recipients so that they can produce better results by utilizing computerized technology.

## B. RESEARCH METHOD

Data collection is done by collecting books, articles, journals, papers, or internet sites related to Naive Bayes and Staple Food, especially those related to methods on computer vision. Writing this journal is a form of writing about the implementation of environmental and social care program activities with mechanical engineering student associations and

involving several lecturers and the community in their participation in social service activities as a manifestation of this form of community service. Through studying and analyzing how data mining methods work, research and design was carried out. An application design with the method chosen is generated from the results of the analysis. Programming (coding) is performed by programming based on a design made using the programming language of Visual Basic. Discussion of outcomes by performing n tests on the application and generating a summary table of results tests.

## C. LITERATURE REVIEW

Poverty is one of the fundamental problems that have become the center of attention of governments in any country. Poverty is one of the problems experienced by several developing countries, including Indonesia. There are many ways to reduce poverty, including social assistance programs for the poor. Based on this explanation, it can be concluded that poverty is a problem faced by many developing countries and has become the center of attention in any country.

Everyone's concern is because they are afraid of contracting because the coronavirus can have an impact on causing death for people with it. Therefore the government provides assistance in the form of basic food packages, to prevent the spread. (Shofiana, 2020). The government is increasingly alert to help ease the burden on the community, especially for those affected by the coronavirus (covid-19). The plan is for the government to provide several types of social assistance in the form of direct cash assistance (BLT) (BLT). The aim of the initiative to include this assistance program is to preserve the community's purchasing power throughout the Corona time. Later, all the assistance will be distributed throughout Indonesia and aimed directly or indirectly at the affected citizens. Interestingly, President Joko Widodo said the government will provide cash assistance of IDR 600,000 a month concerning BST and BLT cash assistance.

Basic food or often abbreviated as SEMBAKO are nine types of basic foods according to the Decree of the Minister of Industry and Trade No. 115 / MPP / Kep / 2/1998 dated 27 February 1998 (abbreviated: "Kepmenperindag 115/1998"). [1] The Ministry of Trade issued Regulation of the Minister of Trade Number 27 / M-DAG / PER / 5/2017 concerning Determination of Reference Prices for Purchases at Farmers and Reference Prices for Sales at Consumers



("Permendag 27/2017") which took effect on May 16, 2017.<sup>[2]</sup>

The nine basic foods that are determined by the reference price for purchase and sale according to "MOT 27/2017" are:<sup>[2]</sup>

1. Rice: The reference price for purchases from farmers, the price of IDRSS 7,300 per kilogram (kg), the reference price for sales at consumers is IDR 9,300 per kg.
2. Corn: The reference price for purchases from farmers is sold at a price range of IDR 2,500-IDR 3,150 per kg, (the lower the moisture content, the higher the price), while the reference price for sales to consumers is IDR 4,000 per kg.
3. Soybeans: Local soybeans for the purchase reference price at farmers are sold for IDR 8,500 per kg, for users / craftsmen for IDR 9,200 per kg. Then for imported soybeans, the reference price for purchases at farmers is IDR 6,550 per kg, and for IDR 6,880 at users per kg.
4. Sugar: The reference price for purchases from farmers is IDR 9,100 per kg, IDR 12,500 per kg for consumers.
5. Cooking Oil: A reference price for bulk oil is set at IDR 10,500 per liter for bulk oil and IDR 11,000 per liter for simple packaging.
6. Onion: The reference price for purchases from farmers is IDR 15,000 per kg for wet konde, IDR 18,300 per kg for onions with leaves (konde Askip), and IDR 22,500 per kg for onions without leaves (Rogol Askip). As for the reference price at the buyer, the Askip Rogol is IDR 32,000 per kg.
7. Frozen Meat and Fresh Meat (Beef): The reference price is only set for consumer purchases, which is IDR 80,000 per kg for frozen meat. As for fresh meat, the quadriceps are IDR 98,000 per kg, hamstrings IDR 105,000 per kg, brisket IDR 80,000 per kg, and bones with a bit of adhering meat IDR 50,000 per kg.
8. Broiler Chicken Meat: The reference price for the purchase at the farmer is set at IDR 18,000 per kg, and IDR 32,000 at the consumer per kg.
9. Broiler chicken Eggs: The reference price for the purchase at the farmer is IDR 18,000 per kg and IDR 22,000 per kg at the consumer.

Visual Basic is a well-known high-level programming language that originated on an "older" machine like the AT286 with BASIC. The BASIC language was a language at the time that could be relied on in an important application. Microsoft Access is an application that can support the creation of database applications that can design, create, and manage databases simply in a relatively short time. Microsoft

Access is also a program application that is very simple to use, flexible in making and designing information systems. The Naïve Bayes classifier is a simple probability classification that calculates a set of probabilities by adding up the frequencies and value combinations from a given dataset. The algorithm uses the Bayes theorem and assumes that all attributes are independent or not interdependent given by the value of the class variable [9]. Another definition states that Naive Bayes is a classification proposed by the British scientist Thomas Bayes using probability and statistical methods, which estimates future possibilities based on previous experience. Naive Bayes is based on the simplifying assumption that attribute values are conditionally independent of each other when given an output value. In other words, the probability of observing together is the product of individual probabilities, given the output value [8]. The advantage of using Naive Bayes is that this method only requires a small amount of training data to determine the parameter estimates needed in the classification process. Naive Bayes often performs much better in most complex real-world situations than might be expected.

The equation of the Bayes theorem is

$$P(X | X) = \frac{P(X | H)P(H)}{P(X)}$$

Where:

X : Data with an unknown class

H : The data hypothesis is a specific class

P(H|X) : The probability of hypothesis H based on condition X (posteriori probability)

P(H) : The probability of hypothesis H based on condition X (posteriori probability)

P(X|H) : Probability X based on the conditions in the hypothesis H

P(X) : Probability X

## D.SYSTEM PLANNING

### 1. System Analysis

The method of data analysis utilizes quantitative data in the form of numerical and nominal mathematics. Naive Bayes is based on the simplified assumption that when an output value is given, attribute values are conditionally independent of each other. In other words, the probability of observing together is the product of individual probabilities, given the output value. The advantage of using Naive Bayes is that this method only requires a small amount of training data to determine the parameter estimates needed in the classification process. In the Naive Bayes method, constant string data is distinguished from continuous



numeric data, this difference will be seen when determining the probability value of each criterion, be it criteria with string data values or criteria with numeric data values. Considering the difficult situation and conditions caused by the impact of the COVID-19 virus nationally have caused the public to feel the

large-scale social restrictions (PSBB) that the Indonesian government implemented to cope with the corona virus outbreak, not a few of them have had difficulty finding fortune and/or loss of a job. So that concern for what they need to meet their basic daily needs.

**Table 1**  
**The need for basic food packages**

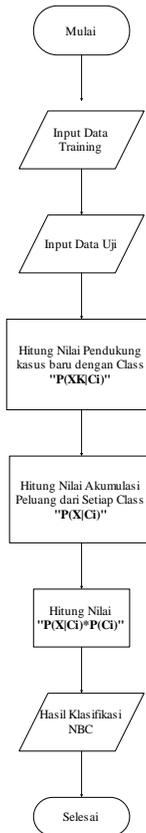
Type	Total	Unit
Rice	5	kg
Canned fish	2	Canned
Cooking oil	1	Liter
Sugar	1	Kg
Instant noodles	5	Package

Source: Head Office of Tanjung Morawa A

## 2. System Design

The next step that is carried out after the research material is obtained is the system design using the Edraw Max software. The design of the system for

determining the level of ripeness of the coffee fruit can be seen in the design of the flowchart and the design of the following system forms:



**Figure 1 Flowchart of Naïve Bayes Classifier**



### 3. Data processing

Data analysis is a step that must be performed after successfully collecting the data. Data Cleaning is being performed at this stage. Data Cleaning is a procedure that must be taken to eliminate noise from previously generated data. Data Cleansing is used to unify data in

the same format so that accurate results from mining can be obtained. The author estimates the data collected after completing the Data Cleaning. Table 3 is the randomly taken training data and Table 4 is the sample test data.

**Table 2**  
**Variabel**

Attribute	Numerization	Description
Gender	0	Female
	1	Male
Age	0	20 - 29 y/o
	1	30 - 40 y/o
	2	> 40 y/o
Position	0	Civil Servants/Police/Indonesian National Army
	1	Private employees
	2	Laid off employees

**Table 3**  
**Case Data**

No	Name	Gender	Age	Position	Basic food recipient
1	Rahmad	1	0	2	No
2	Irwansyah	1	1	2	No
3	Hj. Saniah	0	1	2	No
4	Jumaiyah	1	0	2	No
5	Muhammad Tamrin	1	1	2	Yes
6	Budi Andoko	1	1	1	No
7	Purwanto	1	1	1	Yes
8	Hasbi Hidayatina	1	1	0	No
9	Riya Dewi	0	1	0	No
10	Fitriani	0	1	0	Yes
11	Arman Syahputra	1	1	2	Yes
12	Sri Rizkiyah	1	0	2	Yes
13	Rudi Iskandar Nasution	1	1	2	Yes
14	Rini Susanti	0	1	2	Yes
15	Mhd Maulana Ra	1	2	2	Yes
16	Harry Agus	1	2	1	Yes
17	Razie Alif Ananta	1	2	2	No
18	Samsuddin K	1	1	2	Yes
19	Darlina	1	1	2	Yes
20	Zainab	1	1	1	????

Based on table 3, it can be calculated that the data classification of foodstuff recipients is given if input is Gender, Age, and Occupation using the Naive Bayes

algorithm. If new data input is given, the data classification of foodstuff recipients can be determined through the following steps:

- a. Calculating value of  $P(XK|Ci)$   
 $P(\text{Criteria 1} = \text{"male"} | \text{classification} = \text{"Yes"})$   
 $P(\text{Criteria 1} = 9/15 = 0,6)$



$P(\text{Criteria 1} = \text{"male"} | \text{classification} = \text{"No"})$

$P(\text{Criteria 1} = 6/15 = 0,4$

$P(\text{Criteria 2} = \text{"30-40 y/o"} | \text{classification} = \text{"Yes"})$

$P(\text{Criteria 2} = 8/13 = 0,62$

$P(\text{Criteria 2} = \text{"30-40 Tahun"} | \text{classification} = \text{"Tidak"})$

$P(\text{Criteria 2} = 5/13 = 0,38$

$P(\text{Criteria 3} = \text{"Private employees"} | \text{classification} = \text{"Yes"})$

$P(\text{Criteria 3} = 2/3 = 0,66$

$P(\text{Criteria 3} = \text{"Private employees"} | \text{classification} = \text{"No"})$

$P(\text{Criteria 3} = 1/3 = 0,33$

- b. Calculating value of  $P(X|Ci)$  for every class (label)

$P(X | \text{Classification} = \text{"Yes"})$

$= 0,6 \times 0,62 \times 0,66 = 0,245$

$P(X | \text{Classification} = \text{"No"})$

$= 0,4 \times 0,38 \times 0,33 = 0,050$

- c. Calculating value of  $P(X|Ci) * P(Ci)$

$(P(X | \text{Classification} = \text{"Yes"}) \times P(\text{Classification} = \text{"Yes"})) = 0,245 \times \frac{11}{19} = 0.141842$

$(P(X | \text{Classification} = \text{"No"}) \times P(\text{Classification} = \text{"No"})) = 0,050 \times \frac{8}{19} = 0.021053$

### Specifies the Class of the new case

Based on the final calculation by multiplying the probability value of the cases raised, we see that the P-value ( $X | \text{Information} = \text{"Yes"}$ ) is higher than  $P(X | \text{Information} = \text{"No"}) = 0.141842$  versus  $0.021053$ . So it can be concluded that the food recipients are classified as "Yes"

### E. CONCLUSION

From the study findings, below are a few conclusions:

1. This Classification application can help an officer or village office employee to classify the recipient community or non-recipient of the basic needs.
2. The results of the classification of basic food recipients are based on the highest level of confidence in each label variable for each independent variable.
3. By knowing whether or not the new basic food recipients are yes or no, this will minimize errors in targeting the basic food recipients.

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# **A STUDY OF ANXIETY AMONG SECONDARY STUDENTS IN THE WAKE OF COVID-19 PANDEMIC**

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## **ABSTRACT**

*In today's society it is very likely that majority of people will experience symptoms associated with anxiety at some point. The pace of modern life and the rapid technological changes cause us constantly to feel unable to cope with the demands that are put upon us. Students who are undergoing adulthood when encountered with a torturous or stressful situation such as highly demanding schedules or writing an exam can lead to sense of worry, even fear. This is further augmented by the outbreak of Covid-19 wherein schools are closed and students are mandated to stay at home which causes tension due to consideration of their future career. The findings of the research conducted among Secondary School Students in Aizawl City, shows that male students have relatively lower level of anxiety as compared to their female counterpart. It was also observed that there is no considerable difference in the level of anxiety among students of Secondary Schools based on the occupation of their parents.*

**KEYWORDS:** *Anxiety, Secondary Students, Male, Female*

## **INTRODUCTION**

The word anxiety is derived from the Latin "anxietas" (to choke, throttle, trouble, and upset) and encompasses behavioral, affective and cognitive responses to the perception of danger and is a normal human emotion. In moderation, anxiety stimulates an anticipatory and adaptive response to challenging or stressful events.

In excess, anxiety destabilizes the individual and dysfunctional state results. It is considered as excessive or pathological when it arises in the absence of challenge or stress, when it is out of proportion to the challenge or stress in duration or severity and when it results in significant distress, psychological, social, occupational, biological, and other impairment.

Students are prone to develop anxiety due to tension arising from peers and hefty demands in terms of educational expectations. Researchers found that students' faces many obstacles such as exam anxiety, mathematic anxiety, language anxiety, social anxiety, family anxiety and library anxiety. In a study of the correlation of anxiety sources and the effect of students' academic performance, it was found that high level of anxiety achieved low academic performance. At the global level, anxiety is viewed as a permanent trait, as some people are predisposed to be anxious. The prevalence of study anxiety has been acknowledged by students and educators. With the new normal brought upon by the world wide Covid – 19 pandemic, the uncertainty with regard to their future could have a huge impact on the students which may trigger developments of anxiety that will no doubt affect many aspect of their lives, their academic performance and even their physical wellbeing.



## NEED AND IMPORTANCE OF THE STUDY

The impact of Covid – 19 and the resultant lockdown imposed by the Government has had a profound effect on the society, especially due to close down of shops, educational institutes and even religious gathering, which affects the mental wellbeing of not only the parents but also the students as well. With the new normal brought upon by the world wide pandemic, the uncertainty with regard to their future could have a huge impact on the students which may trigger development of anxiety that will no doubt affect many aspects of their lives, their academic performance and even their physical wellbeing. In order to ensure that the students are getting the care they need, not only the teachers but also the whole community has to be mobilized to fend off the negative impact it will have on the students.

## OBJECTIVES OF THE STUDY

1. To find out the anxiety level of Secondary School Students in Aizawl City.
2. To compare the level of anxiety between male and female of Secondary School Students in Aizawl City.
3. To find out and compare the level of anxiety among Secondary School Students in relation to whether their parents are Govt. Servant or otherwise.

## HYPOTHESIS OF THE STUDY

1. There is no significant difference in the anxiety level between male and female students of Secondary Schools in Aizawl City.
2. There is no significant difference in the anxiety level of Secondary School Students in relation to whether their parents are Govt. Servant or otherwise.

## METHODOLOGY AND PROCEDURE

### Method of the study

Descriptive Survey Method was adopted for the study.

### Population and Sample

The population in the present study consists of Secondary School Students in Aizawl city.

### Sample

The investigator selected 50 students from a random sample among of Secondary School Students in Aizawl city.

### Tools Used

In the present study the investigator used the “Anxiety, Depression and Stress Scale” (ADSS-BSPSA) by Pallavi Bhatnagar, Megha Singh, Manoj Pandey, Sandhya and Amitabh. It consisted 48 items which were again distributed into three areas.

### Procedure of Data Analysis

The distributed questionnaires were collected by the investigator by means of the internet and then tabulated, analyzed and interpreted carefully. For analyzing data, statistical technique i.e. Mean, Standard Deviation, percentage is employed to find accurate results. General-‘t’ test was applied for comparison and then descriptive interpretations were made to draw the conclusion.

## ANALYSIS AND INTERPRETATION OF THE STUDY

Table 1: Analysis of the anxiety level of Secondary School Students

ANXIETY	NO. OF STUDENTS	PERCENTAGE	Mean Score
Normal	13	26%	6.77
Mild	9	18%	
Moderate	15	30%	
Severe	13	26%	



Analysis of data, vide Table1 revealed the precise anxiety level of secondary school students in Aizawl City. It shows that out of 50 respondents, student showing moderate level of anxiety consists of the largest part. Since the mean score of the sample is 6.77, it can be construed that secondary school students have moderate level of anxiety.

**Table2: Comparison of anxiety level of male and female secondary school students in Aizawl City**

Sl.No	Gender	No. of students	Mean score	Standard deviation	Standard error of difference	t-value	Level of significance
1	Male	25	5.62	3.80	0.58	3.96	Significant
2	Female	25	7.92	4.34			

A comparative study of the mean score of male and female respondents revealed that male students have normal anxiety level while female students fall under severe level of anxiety. The critical 't'-value for the comparison of male and female in relation to anxiety, is found to be 3.96 which is significant at 0.01 level. The findings implied that there is no difference in the level of anxiety between male and female.

Hence, the hypothesis that there is no significant difference in the anxiety level between male and female students of Secondary Schools in Aizawl City is rejected.

**Table 3: Comparison of anxiety level of secondary school students based on whether their parents are Government Servant or otherwise.**

Father's occupation	No. of students	mean	Standard deviation	Standard error of difference	t-value	Level of significance
Government servant	19	6.26	4.18	0.62	1.34	Not-significant
Others	31	7.09	4.26			

Comparison of the analysis shows that the mean score of students having Government service father is slightly lower than the mean score of students having non-government servant father. The calculated t-value 1.34 was smaller than the critical t-value at 0.05 levels.

Hence, the hypothesis that there is no significant difference in the anxiety level among Secondary Students of Deficit Mission Schools in Aizawl City in relation to their father's occupation is accepted.

## MAJOR FINDINGS

1. From the above analysis, it was evident that ,secondary school students in Aizawl City, shows moderate level of anxiety.
2. Based on the research conducted among Secondary School Students in Aizawl City, it was found that male students have relatively lower level of anxiety as compared to their female counterpart.
3. It was observed that there is no considerable difference in the level of anxiety among students of Secondary Schools based on the occupation of their parents.

## DISCUSSIONS

It is important to study psychological problems like anxiety as it is increasing at a great pace among adolescents. This study further illustrates the depth of prevalence of anxiety among secondary school students in Aizawl city. The overall study shows that out of all the respondents *26% shows no sign of anxiety, 18% shows mild anxiety, 30% shows moderately anxiety* while *26% were found to have severe level of anxiety*. From the comparative table it can be seen that

male students showed normal level of anxiety while female students showed severe level of anxiety. As such, this finding concluded that female students have more anxiety as compared to their male counterpart. This was also in line with the findings of Mahnaz F. Khesht-Masjedi, et al., (2019) and Preeti Sharma, Mustafa Nadeem Kirmani (2015).

There exists no significant difference in the level of anxiety among secondary students in relation to their parents occupation since the calculated t-value 1.34 was smaller than the critical table value at 0.05 level. This indicated that the economic impact of the global pandemic has no profound effect on the anxiety level of students. This is well expected since students are more or less dependent on their parents for financial support.



Since, their daily needs are provided by their parents, they have not felt the hardship caused by Covid -19 and its resultant lockdown.

Both the results established corroborate with the outcome of our research with minor variation in the level of severity. It is believed that the prevalence of anxiety is slightly modest than their results as the anxiety in our study accounts almost two-third of the total number of students even though it varies from mild to severe anxiety.

## CONCLUSION

Secondary stage is a stressful period of adolescence due to physical, psychological, sexual changes and the presence of psychiatric disorders. According to the study, the overall prevalence of anxiety among secondary school going adolescents in Aizawl was moderate. It was evident that gender plays an important part in the anxiety level of students in which, female students was found to have more anxiety as compared to their male counterpart. This indicated that, it is very important to be more aware of the mental status of adolescence. The increasing academic work load and other intrinsic and extrinsic factors increase the risk of students being exposure to these mental disorders overtime. Hence, the solution lies in being able to identify this disorder. Early, intervention and providing support with adequate and appropriate services is recommended.

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## DRUG APPROVAL AND BIOEQUIVALENCE OVERVIEW

Amol Bongirwar, Pravinkumar More, Amol Sonawane, Gouthami Amol Bongirwar

### ABSTRACT

*Bioavailability is used to describe the fraction of an administered dose of medication that reaches the systemic circulation, one of the principal properties of the drug. By definition, when the drug is administered intravenously, its bioavailability is 100%. Bioequivalence studies compare both the rate and extent of absorption of various multisource drug formulations with the innovator (reference) product, on the basis that if two formulations exhibit similar drug concentration time profile in the blood/plasma, they should exhibit similar therapeutic effects. Numerous papers in the literature indicate that there is concern that the current standards for approval of generic drugs may not always ensure therapeutic equivalence. The availability of different formulations of the same drug substance given at the same strength and in the same dosage form poses a special challenge to health care professionals. Once bio-equivalence has been established via bioavailability testing in a statistically significant manner subsequent batches of the same product are deemed bio-equivalent based on in-vitro measures such as drug dissolution.*

**KEYWORDS:** Bioavailability, Bioequivalence studies, Replication.

### INTRODUCTION

Bioavailability is used to describe the fraction of an administered dose of medication that reaches the systemic circulation, one of the principal properties of the drug. By definition, when the drug is administered intravenously, its bioavailability is 100%. However when a medication is administered via other routes (such as by mouth), its bioavailability decreases (due to incomplete absorption and first-pass metabolism). Bioavailability is one of the essential tools in pharmacokinetics, as bioavailability must be considered when calculating dosage for non-intravenous route of administration.

Bioavailability and Bio equivalence of drug products and drug product selection have emerged as critical issues in pharmacy and medicine during the last three decades. Concern about lowering health care costs is resulted in a tremendous increase in the use of generic drug products currently about one half of all prescriptions written are for drugs that can be substituted with a generic product.

This phenomenal growth of the generic pharmaceutical industry and the abundance of multi-source products have prompted some questions among many health professionals and scientists regarding the therapeutic equivalency of these products. Inherent in the currently accepted guidelines for product substitution is the assumption that a generic drug considered to be Bioequivalent to a brand-name drug would elicit the same clinical effect.

Numerous papers in the literature indicate that there is concern that the current standards for approval of generic drugs may not always ensure therapeutic equivalence. The

availability of different formulations of the same drug substance given at the same strength and in the same dosage form poses a special challenge to health care professionals.

If the size of the dose to be administered is same, then bioavailability of a drug from its dosage form depends upon three major factors:

1. Pharmaceutical factors related to physicochemical properties of the drug and characteristics of dosage form.
2. Patient related factors.
3. Route of administration.

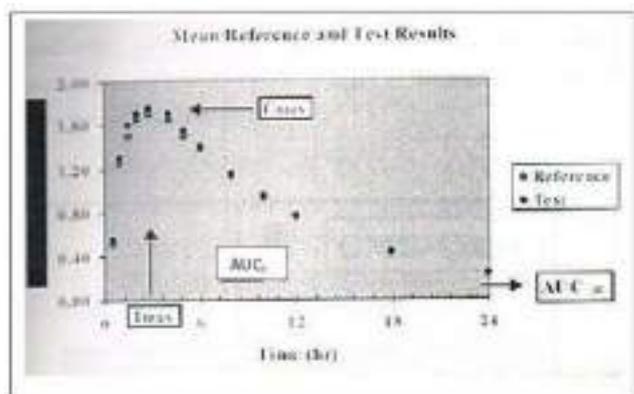
If the goal is to compare the two formulation of same drug then the experimental design should maintain the remaining factors constant. The resultant bioavailability may differ with respect to the amount absorbed, the rate of absorption or both. The bioavailability fraction is the fraction of the administered dose that enters systemic circulation.

$$f = \text{Bioavailable Dose} / \text{Administered Dose}$$

Bioavailability reflects the extent of the systemic availability of the 'area under the concentration time curve' (AUC), the peak plasma concentration (C<sub>max</sub>) and the time to reach C<sub>max</sub> (T<sub>max</sub>). The extent of the systemic availability is determined by the extent of drug absorbed from the site of administration. For a drug that obeys linear pharmacokinetics, the AUC and C<sub>max</sub> values increase proportionately with the dose. Consequently, if two formulations / dosage form of the same drug exhibit comparative AUC values, they are considered to have similar systemic availability. The bioavailability of an oral dosage form or a drug is generally compared with an intravenous solution (100% standard), to determine the absolute bioavailability.

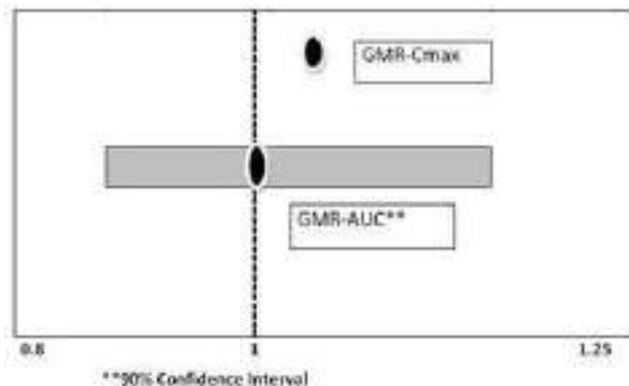
## Comparative Bioavailability: a universal approach

Most bioavailability studies, whether for a new or generic product, possess a common theme. A test conducted to identify the quantitative nature of a specific product comparison. This comparison for a new may be, for example, to assess the performance of an oral formulation relative to that of an intravenous dose or perhaps the performance of a modified-release formulation in comparison to a conventional capsule. For a generic product, it is typically a comparison of a competitive formulation with a reference product. Such commonality surrounding comparative bioavailability studies suggests a universal experimental approach.



**Figure 1:** illustration of the key metrics in a comparative bioavailability trial showing, for example, Test and Reference products. The maximum concentration (Cmax) occurs at the Tmax.

From the figure 1, the two primary metrics for such concentration versus time profiles are the area under the curve (AUC) and the maximum observed concentration (Cmax); the former customarily includes the AUC to the last sampling time in a trial (AUCt) and the extrapolated total AUC to time infinity (AUC∞). The time at the maximum concentration (Tmax) is also of some minor interest.



**Figure 2:** an illustration of the statistical criteria to be satisfied to gain equivalence status in a comparative bioavailability assessment. For example, in a

bioequivalence trial, the geometric mean ratio for the test/reference Cmax (GMR Cmax) must be located between 0.8 and 1.25. The GMR AUC's (whether AUCt or AUC∞) and their computed 90% confidence intervals reside completely within the 0.8 to 1.25.<sup>1-10</sup>

The AUCt is the total area under the concentration versus time profile to the last sampling time. The area to computing the metrics, conclusions need to be reached regarding the comparison. Statistical methods are applied to test if the metrics are sufficiently similar to be considered equivalent. When the metrics are deemed equivalent, the drug concentration profiles are regarded as fundamentally the same. To achieve this equivalence, the study products geometric mean ratios (eg. AUC test / AUC reference), as well as their projected 90% confidence intervals for the population mean ratio, must be located within an 80 to 125% window. For the maximum concentration (Cmax) some regulatory agencies consider it adequate if only the mean ratios are within the interval.

### Measurement of Bioavailability<sup>11</sup>

The methods useful in quantitative evaluation of bioavailability can be broadly divided into two categories:

- A) Pharmacokinetic method
- B) Pharmacodynamic Method

#### A) Pharmacokinetic Method<sup>11</sup>

These are very widely used and based on the assumption that the pharmacokinetic profile reflects the therapeutic effectiveness of a drug. Thus, these are indirect methods.

The two major pharmacokinetic methods are:

- a) Plasma level-time studies.
- b) Urinary excretion studies.

#### B) Pharmacodynamic Method<sup>11</sup>

These methods are complementary to pharmacokinetic approaches and involve direct measurement of drug effect on a (patho) physiological process as a function of time. The two pharmacodynamic methods involve determination of bioavailability from:

- a) Acute Pharmacological Response.
- b) Therapeutic Response.

## BIOEQUIVALENCE

Bioequivalence gained increasing attention during the last 40 years after it became evident that marketed products having the same amounts of the drug may exhibit marked differences in their therapeutic responses. Generally, these differences were well correlated to dissimilar drug plasma levels caused mainly by impaired absorption. Now a considerable body of evidence has accumulated indicating that drug response is better correlated with the plasma concentration or with the amount of drug in the body than with the dose administered. Consequently, on the basis of simple pharmacokinetic concepts and parameters, bioavailability and bioequivalence studies have been established as acceptable surrogates for expensive, complicated and lengthy clinical trials and



are used extensively worldwide to establish and ensure consistent quality and a reliable, therapeutically effective performance of marketed dosage forms.

The present day bio equivalence studies are too complicated, expensive and difficult to be carried out. Two of the reasons for this difficulty are the need for many healthy volunteers and withdrawing 10-20 blood samples from an indwelling catheter from each volunteer spanning over a long period of time. Same procedure has to be repeated after a washout period, substituting the reference and test samples in the volunteers. The entire have to be chemically analyzed and the collected data subjected to elaborate statistical analysis. The parameter 'area under the curve' can have nearly the same values for vastly.

Bioequivalence products as it reflect only the total amount of drug reaching the systemic circulation. Bioequivalence studies compare both the rate and extent of absorption of various multisource drug formulations with the innovator (reference) product, on the basis that if two formulations exhibit similar drug concentration- time profile in the blood/plasma, they should exhibit similar therapeutic effects three situations have thus been defined in which bioequivalence studies are required

- When the proposed marketed dosage form is different from that used in pivotal clinical trials.
- When significant changes are made in the manufacture of the marketed formulation.
- When a new generic formulation is tested against the innovator's marketed product.

Comparative evidence may require not only studies in a fasting condition, but following a specified meal. The later permit drug formulations to be evaluated under 'stressed conditions'. If it is shown that competitive products are bioequivalent under both fasting and fed conditions, there is greater confidence that they are therapeutically equivalent when used in patients. Bio-equivalent simply means that one brand or dosage form of a drug or supplement is equivalent to a reference brand or dosage form of the same drug or supplement in terms of various bioavailability parameters measured via in-vivo testing in human subject. Bio-equivalence cannot be claimed based on in-vitro testing only or on the basis of animal studies only. Bio-equivalence of human drugs must be determined in humans via established measures of bioavailability. By the same taken animal drugs must be tested for bio-equivalence in the animal species for which the drug in intended. Once bio-equivalence has been established via bioavailability testing in a statistically significant manner subsequent batches of the same product are deemed bio- equivalent based on *in-vitro* measures such as drug dissolution.

There is no such thing as increased bioequivalence. The statement of increased bioequivalence makes no sense. A product can be either bio-equivalent or bio-in equivalent. A product can't be more bio-equivalent or less bio- equivalents.<sup>12</sup>

### **Comparative bioavailability for generic drug products (ANDA) - Bioequivalence Studies**

The deductive inference concept is also central to bioequivalence testing. The foundation is set, first, through evidence that a specified, approved, reference drug product (e.g. tablet from the innovative manufacturer) has shown acceptable safety and efficacy through an array of clinical trials.

Second, a widely held view is embraced that the time-dependent drug concentrations in blood from such a reference product are intimately linked with the therapeutic effects.

Third, a principle is adopted, namely that chemically equivalent (same amount of the same active ingredient) and pharmaceutically equivalent products (same dosage form; e.g. conventional tablet), that exhibit the same rate and extent of drug absorption, are bioequivalent. Fourth, bioequivalent products by inference are considered therapeutically equivalent.

When a manufacturer thereby wishes to gain therapeutic equivalence by introducing a competitive generic product into the marketplace, it is not necessary to conduct the full array of trials needed for the first (innovative) product. If equivalence has been demonstrated, according to prescribed study requirements, appropriately determined metrics (Figure 1), and statistical criteria (Figure 2), the generic product by inference is regarded as therapeutically equivalent to the innovative drug product.

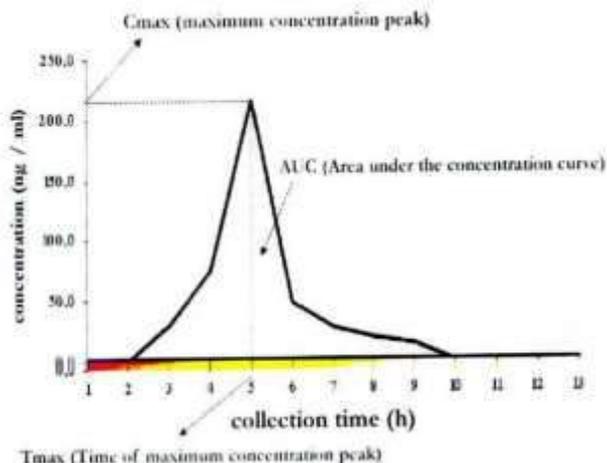
The design of and requirements in, bioequivalence studies are fundamentally satisfied through single dose administrations, although there is a lingering interest in multiple dose testing. The focus is on the rate and extent of absorption of the active ingredient, although some jurisdictions (e.g. FDA) continue to show an interest in the primary active metabolite(s).

In some cases, notably drugs that exhibit non-linear pharmacokinetics, the dose strength to be tested may be dictated by whether the drug's non-linearity is attributable to the absorption or elimination phase (Health Canada). As a general principle, the studies are designed to test inherent product absorption properties. Thereby, the trials generally specify healthy normal controls that exhibit circumscribed demographics.

### **Pharmacokinetic Measurement<sup>11, 17, 18</sup>**

Direct (e.g., rate constant rate profile) and indirect (e.g., C<sub>max</sub>, T<sub>max</sub>, mean absorption time, mean residue time, C<sub>max</sub> normalized to AUC) pharmacokinetic measurements are limited in their ability assess rate of absorption.

From these direct or indirect measurements of absorption rate to measures of systemic exposure. C<sub>max</sub> and AUC can continue to be used as measures for product quality BA and BE, but more in terms of their capacity to reflect rate and extent of absorptions.

**Figure 3****Before Peak Concentration**

For orally administered immediate release drug products, BE may generally be demonstrated by measurement of peak and total concentration. An early concentration measure may be indicated on the basis of appropriate clinical efficacy/safety trials and/or pharmacokinetic / pharmacodynamic studies that call for better of drug absorption into the systemic circulation (e.g., to ensure rapid onset of an analgesic effect or to avoid an excessive hypotensive action of an antihypertensive). In this recommends use of partial AUC as a Before Peak Concentration. The partial area should be truncated at the population median of Tmax values for the reference formulation. At least two quantifiable samples should be collected before the expected peak time to allow adequate estimation of the partial area.

**Peak Concentration**

Peak concentration should be assessed by measuring the peak drug concentration (Cmax) obtained directly from the data without interpolation.

**Total Concentration**

For single dose studies, the measurement of total concentration should be: Area under the plasma/serum/blood concentration-time curve from time zero to time t (AUC<sub>0-t</sub>), where t is the last time point with measurable concentration for individual formulation, Area under the plasma/serum/blood concentration-time curve from time zero to time infinity. (AUC<sub>0-∞</sub>), where AUC<sub>0-∞</sub> = AUC<sub>0-t</sub> + Ct/z, Ct is the last measurable drug concentration and z is the terminal or elimination rate constant calculated according to an appropriate method. The terminal half-life (t<sub>1/2</sub>) of the drug should also be reported.

The following pharmacokinetic parameters are required for submission:

- Plasma concentrations and time points.
- Subject, period, sequence, treatment.
- AUC<sub>0-t</sub>, AUC<sub>0-∞</sub>, Cmax, Tmax, and t<sub>1/2</sub>.
- Inter subject, intra subject, and/or total variability, if

available.

- Cmin (concentration at the end of a dosing interval).
- Cav (average concentration during a dosing interval).
- Degree of fluctuation [(Cmin-Cmin)/av].
- Swing [(Cmax-Cmin)/Cmin] if steady state studies are employed.

The following statistical information required for AUC<sub>0-t</sub>, AUC<sub>0-∞</sub>, and C max:

- Geometric mean
- Arithmetic mean
- Ratio of mean
- Confidence intervals

Logarithmic transformation should be provided for measures used for BE demonstration.

**Rounding off of confidence interval values**

Confidence interval (CI) values should not be rounded off; therefore, to pass a CI limit of 80-125, the values should be at least 80.00 and not more than 125.00.<sup>12, 13, 18</sup>

**GENERAL CONCEPT OF DESIGN AND CONDUCT OF STUDIES**

The design and conduct of the study should follow EC- rules for good clinical practice, including reference to an Ethics Committee.

As recommended by the US FDA (1992), in most bioequivalence trials, a 'test' formation is compared with the standard / innovator 'reference' formulation, in a group of normal, healthy subjects (18-55 yr), each of whom receive both the treatments alternately, in a crossover fashion (two-period, two-treatment crossover design), with the two phases of treatment separated by a 'washout period' of generally a week's duration, but may be longer (a minimum time equivalent to 5 half-lives) if the elimination half-life of the drug is very long. The treatment is assigned to each subject, randomly, but an equal number of subjects receive each treatment in each phase. Thus, in case of two treatments A and B, one group gets the treatment in the order AB and the second group in the reverse order BA. This is done to avoid the occurrence of possible sequence or period effects. A similar allocation is done in case of a three treatment crossover design (three-period, three-treatment crossover design).

For several drugs great-subject variability in clearance is observed. The intra-subject coefficient of variation (approximately 15%) is usually substantially smaller than that between subjects (approximately 30%), and therefore, crossover designs are generally recommended for bioequivalence studies.

The primary advantage of the crossover design is that since the treatments are compared on the same subject, the inter subject variability doesn't contribute to the error variability. If the drug under investigation and/or its metabolites has an extremely longer half-life, a parallel group design may be indicated. In a parallel group design,



subjects are divided randomly into groups, each group receiving one treatment only. Thus, each subject receives one treatment only. In a parallel design, although one doesn't have to worry about sequence, period or carry over effects, or dropouts during the study, the inter-subject variability being very high, the sensitivity of the test is considerably reduced, thus requiring a larger number of subjects compared to a crossover design, to attain the same sensitivity.

Inherent in both the crossover and parallel designs are the three fundamental statistical concepts of study design, namely

- Randomization
- Replication and Error control

### Randomization

It implies allocation of treatments to the subjects without selection bias. Consequently, Randomization is essential to determine an unbiased estimate of the treatment effects.

### Replication

It implies that a treatment is applied to more than one experimental unit (subject) to obtain more reliable estimate than is possible from a single observation and hence provides a more precise measurement of treatment effects. The number of replicates (sample size) required will depend upon the degree of difference to be detected and inherent variability of the data. Replication is used concomitantly with "Error Control" to reduce the experimental error or error variability.<sup>14</sup>

More commonly used replicated crossover designs to compare two formulations are:

- Four sequence and two-period design (Balaam's Design)
- Two sequence and four-period design
- Four sequence and four-period design
- Two sequence and three-period design
- Crossover design for three medications (William's Design)
- Crossover design for four medications (William's Design)

### Crossover design for two medications (T-test; R=reference)

#### ➤ 2x2 crossover design

This is a conventional not-replicated design with formulations, two periods, two sequences that may be represented as follows:

**Table 1: 2x2 Crossover Design**

Sequence	Period	
	1	2
1	R	T
2	T	R

Each individual is randomly assigned to RT or TR sequence in two dosage periods. That is, individual assigned to RT (TR) sequence receive formulation R (T) in the first dosage period and formulation T (R) in the second dosage period. Randomization for a 2x2 crossover study may be carried out through tables of random numbers or randomization procedures implemented by statistical software.

#### ➤ Replicated crossover design

This design is recommended for bioequivalence studies of formulations with modified-release dosage or highly variable products (intra-individual variation coefficient  $\geq 30\%$ ), including the quick release ones and other oral administration products.

The same test and reference formulation batches shall be used for this design for replicated administration. The periods shall be sufficiently spaced (washout) to assure non-existence of carryover effects.<sup>23</sup>

More commonly used replicated crossover designs to compare two formulations are:

**Table 2: Two sequence and four-period design**

Sequence	Period			
	1	2	3	4
1	T	R	R	T
2	R	T	T	R

**Table 3: Four sequence and four-period design**

Sequence	Period			
	1	2	3	4
1	T	T	R	R
2	R	R	T	T
3	T	R	R	T
4	R	T	T	R

**Table 4: Two sequence and three-period design**

Sequence	Period		
	1	2	3
1	T	R	T
2	R	T	R

**Table 5: Crossover design for three medications (william's design)<sup>15</sup>**

Sequence	Period		
	1	2	3
1	R	T2	T1
2	T1	R	T2
3	T2	T1	R
4	T1	T2	R
5	T2	R	T1
6	R	T1	T2

(William's design with T1 = test, T2 = test, R = Reference) In order to compare three formulations of a drug, there are a total of three possible comparison pairs among formulations: formulation-1 versus formulation-2, formulation-1 versus formulation-3, and formulation -2 versus formulation =3.<sup>15</sup>

**Table 6: Crossover Design For Four Medications (William's Design)<sup>15</sup>**

Sequence	Period			
	1	2	3	4
1	R	T3	T1	T2
2	T1	R	T2	T3
3	T2	T1	T3	R
4	T3	T2	R	T1

## PROTOCOL DESIGNING

### General Information

- Product title, number and date.
- Confidentiality paragraph.
- Name and address of the sponsor and monitor (in the event he is not the sponsor).
- Name and address of the clinical laboratories.
- Names and titles of the investigators and co-investigators.

### Information on the Study Design

- Study type and design.
- Primary and secondary objectives.
- Description of the randomization and blinding procedure. Study treatments and dosages regimen, including package and label information.

### Information on study population

- Number of patients.
- Duration of subject participation.
- Informed consent form.
- Maintenance of the randomization codes and procedures for code break (double-blind study)

### Selection and Discontinuation

- Inclusion criteria.
- Exclusion criteria.
- Compliance monitoring method.
- Patient discontinuation criteria: when and how to discontinue; type of to be collected; subject replacement; discontinued follow up.
- Subject treatment; Names of all products, doses, dose escalation, administration routes, treatment period and follow up period; allowed and forbidden treatment/medication, before and during the study.

### Efficacy and Safety evaluation

- Specification of the efficacy and safety parameters.
- Methods and time points to evaluate record and analyze these parameters.
- Type and duration of subject follow-up after the occurrence of an adverse event.
- Procedures for the recording and reporting of adverse events and intercurrent illnesses.

### Conduction of the study

- Monitoring frequencies.
- Audits.
- Data and records maintenance.
- Publication policy.
- Procedures to monitor subject compliance.

### Others

- Clinical laboratory parameters.
- Concomitant therapy.
- Documentation of investigator's approval and date (signature page)
- Funding and insurance.
- Direct access.
- Ethics.<sup>19, 20</sup>

## APPLICATION FOR PRODUCT CONTAINING NEW ACTIVE SUBSTANCES

### Bioavailability

In the case of new active substances (new chemical entities) intended for systemic action the pharmacokinetic characterization will have to include the determination of the systemic availability of the substance in its intended pharmaceutical form in the comparison with intravenous administration. If this is not possible the bioavailability relative to a suitable oral solution or standardized suspension should be determined. In the case of a prodrug the intravenous reference solution should preferably be the therapeutic moiety.

### Bioequivalence

The dosage recommendations for the market form of a new active substance should be validated by a comparative bioavailability study against the forms used in the clinical trials, especially those used in the dose finding studies, unless its absence can be justified by satisfactory in vitro data.<sup>16</sup>



## **APPLICATIONS FOR PRODUCTS CONTAINING APPROVED ACTIVE SUBSTANCES**

### **Bioequivalence Studies**

Bioequivalence is required if a product is intended to be substituted for an approved medicinal product. Requirements for the demonstration of Bioequivalence may vary with this type of product.

### **Oral Immediate Release Products with Systemic Action**

Bioequivalence studies should be performed for all immediate release products intended for systemic action unless, considering all of the following criteria, the applicant can establish that in vitro are sufficient to ensure Bioequivalence.

As an example in vitro data alone would be acceptable if all of the following criteria are fulfilled, as follows:

- A) The active substance is known not to require special precautions with respect to precision and accuracy of dosing, e.g., it does not have a narrow therapeutic range.
- B) The pharmacokinetics is characterized by a pre-systemic elimination / first pass metabolism less than 70% and linear pharmacokinetics within the therapeutic range.
- C) The drug is highly water soluble i.e., the amount contained in the highest strength is dissolved in 250ml of each of three pharmacopoeial buffers within the range of pH 1-8 at 37°C (preferably at or about pH 1.0,4.6,6.8).  
The drug is permeable in the intestine, i.e., its extent of absorption is greater than 80%. Permeability of a drug substance can be determined by different methods, such as in vivo (e.g., CaCO<sub>2</sub> cell cultures) and in situ (e.g., intestinal perfusion in animals). The choice of the method has to be justified by the applicant in terms of ability to predict the rate and extent of absorption in humans. Stability of the drug should be documented under various conditions typical for the gastrointestinal tract.
- D) The excipients included in the composition of the medicinal product are well established and no interaction with the pharmacokinetics of the active substance is expected.<sup>21, 22</sup>

### **Oral Solutions**

If the product is an aqueous oral solution at time of administration containing the active substance in the same concentration and form as a currently approved medicinal product, not containing excipients that may affect gastrointestinal transit or absorption of the active substance, then a bioequivalence study is not required.

In those cases where an oral solution has to be tested against a solid dosage form (e.g., an oral solution is formulated to be equivalent to an existing tablet), a comparative bioavailability study will be required unless an exemption can be justified (see 5.1.1).<sup>21, 22</sup>

### **Modified Release Dosage Form**

Modified Release products include delayed-release products such as enteric-coated dosage forms and extended (controlled)-release products. Bioequivalence studies for delayed-release drug products are similar to those for extended-release drug products. Extended-release products can be capsules, tablets, granules, pellets and suspensions. For extended-release and delayed-release drug products, the following studies are recommended.

- A single dose, non replicate, fasting study comparing the highest strength of the test and reference listed drug product.
- A food-effect, no replicate study comparing the highest strength of the test and reference product.

### **Fixed Combination Product**

Combination of product should be assessed with respect to the bioavailability and bioequivalence of individual active substance either separately or as an existing combination.

### **Parenteral Formulations**

The applicant is not required to submit a bioequivalence study if the product is to be administered as an intravenous solution containing the active ingredient in the same concentration as the currently authorized product.

In the case of other routes, e.g., intramuscular or subcutaneous, the product must be the same type of solution (aqueous or oily), contain the same concentration of the active substance and the same or comparable excipients as the medicinal product currently approved for this exemption to apply.

### **Gases**

If the product is a gas for inhalation a bioequivalence study is not required.

### **Locally Applied Products**

For products for local use (after oral, nasal, ocular, dermal, rectal, vaginal, etc) administration intended to act without systemic absorption the approach to determine bioequivalence based on systemic measurements is not applicable and pharmacodynamic or comparative clinical studies are in principle required (see specific Note for Guidance).

### **In Vitro Dissolution**

Dissolution studies are required either as complementary (see 3.10) or surrogate to bioequivalence studies and must follow the guidance as laid out in Appendix - 4. In the later case similarity of dissolution profile between test product and reference product based on discriminatory tests should be demonstrated.<sup>21</sup>

### **Variations**

If a product has been reformulated from the



formulation originally approved or the manufacturing method has been modified by the manufacturer in ways that could be considered to impact on the bioavailability, a bioequivalence study is required, unless otherwise justified. Any justification presented should be based upon general considerations, e.g., as per 5.1.1, or on whether an acceptable *in vivo*/ *in vitro* correlation has been established.

In cases where the bioavailability of the original product has been investigated and an acceptable correlation between *in vivo* performance and *in vitro* dissolution rate has been established, the requirements for the bioequivalence can be waived if the dissolution rate *in vitro* of the new product is similar with that of the already approved medicinal product under the same test conditions as used to establish the correlation. In all other cases bioequivalence studies have to be performed.

When variations to an essentially similar product are made in the reference product for the bioequivalence study should be the innovator's product.<sup>23</sup>

### Dose Proportionality in Oral Form

If a new application concerns several strengths of the active substance only one bioequivalence study with the highest strength is necessary ( unless a lower strength is chosen for reasons of safety) provided that the pharmaceutical products are manufactured by the same manufacturer, at the same manufacturing site and all of the following conditions hold:

- Pharmacokinetics has shown to be linear over the therapeutic dose range.
- The qualitative composition of the different strengths is the same.
- The ratio between active substance and the excipients is the same or in the case of preparations containing a low concentration of the active substance, the ratio between the excipients is the same.
- The dissolution profile should be similar under identical conditions for the additional strength of the batch used in the bioequivalence study.

If a new strength is applied for on the basis of an already approved medicinal product and all of the stated conditions hold then a bioequivalence study is not necessary.<sup>24</sup>

### Suprabioavailability

If a suprabioavailability is found, i.e. if the new product displays a bioavailability appreciably larger than the approved product, reformulation to lower dosage strength should be performed. The biopharmaceutical development should be reported and a final comparative bioavailability study of the reformulated new product with the old approved product should be submitted.

In case of reformulation is not carried out the dosage recommendation for suprabioavailable product will have to be supported by clinical studies is different from the reference product. Such a pharmaceutical

product should not be accepted as therapeutic equivalent to the existing reference product should not accepted as therapeutic equivalent to the existing reference product and if marketing authorization is obtained the new product may be considered as a new reference product.<sup>22, 25</sup>

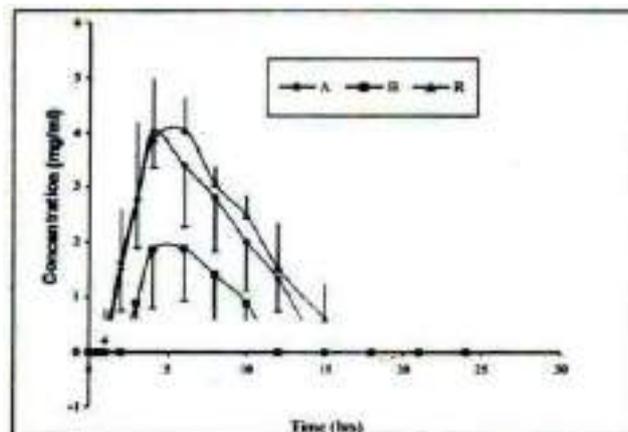


Figure 4: Mean plasma concentration ( $\pm$ SD) vs Time profile

### ACCEPTANCE CRITERIA FOR BIOEQUIVALENCE STUDIES

The pharmacokinetic characteristics to be tested, the procedure for testing and the acceptance ranges should be stated before hand in the protocol. In studies to determine average Bioequivalence the accepted ranges for the main characteristics are:

#### AUC-ratio

The 90% confidence interval for this measure of relative bioavailability should lie within an acceptance range of 0.80-1.25. In case of an especially narrow therapeutic range the acceptance range may need to be tightened. In rare cases (e.g. highly variable drugs) a wider acceptance range may be acceptable if it is based on sound clinical justification.

#### Cmax-ratio

This measure of relative bioavailability may be more variable than the AUC-ratio and a wider acceptance range may be acceptable. The range used should be justified in the protocol taking into account safety and efficacy consideration.

#### Tmax-diff

Statistical evaluation of Tmax only makes sense if there is a clinically relevant claim for release or action or signs for a relation to adverse effects. The non-parametric 90% confidence interval for this measure of relative bioavailability should lie within a clinically determined range.

**Others:** For others pharmacokinetic parameters (e.g. Cmin, Fluctuation,  $t_{1/2}$ , e.t.c..) considerations to those for



AUC, C<sub>max</sub>, t<sub>max</sub> apply. [25]

### History of Generic Drug Approval

As recently as 40 years ago, drug companies could release new products with far less testing than is required today the real test of a drug's safety and effectiveness came after it went to market. If too many patients had bad reactions, the drug could be pulled off the shelves. The danger of this approach became tragically clear when the sedative thalidomide caused thousands of devastating birth defects in Europe, Canada, Latin America, Africa, and Asia (6).

In 1970 FDA established the ANDA as a mechanism for the review and approval of generic versions.

Before 1978, generic product applicants were required to submit complete safety and efficacy through clinical trials Post 1978,

Applicants were required to submit published reports of such trials documenting safety and efficacy.

Neither of these approaches was considered satisfactory and so originated Hatch Waxman Act on 1984 (7).

### Indispensability grounds for Generics (8)

Contain the same active ingredients as the innovator drug (inactive ingredients may vary).

Must be identical in strength, dosage form, and route of administration.

Must have same use/indications

Must be bioequivalent.

Must have same batch requirements for Identity, Safety & Purity.

C) Must follow strict standards of FDAs GMPs.

D)

### Related act's to the ANDA Submission

#### Hatch-Waxman Act

The Drug Price Competition and Patent Term Restoration Act (known as the "Hatch-Waxman Act" enacted in 1984. In 1984, Congress enacted the Hatch-Waxman Act as an amendment to the Federal Food, Drug, and Cosmetic Act (the "FDCA") and the Patent Act. The two main goals are to encourage innovation in pharmaceutical research and development and to help generic drugs reach the market more quickly (9). "The Hatch-Waxman Act is an act dealing with the approval of generic drugs and associated conditions for getting their approval from FDA, market exclusivity, rights of exclusivity, patent term extension and Orange Book Listing."

### General provisions of the act

Creation of section 505(j), Section 505(j) established the ANDA approval process. The timing of an ANDA approval depends in part on patent protections for the innovator drug NDA must include any patent that claims

the "drug" or a "method of using [the] drug" for which a claim of patent infringement could reasonably be asserted. On approval of NDA, FDA publishes patent information for drug in Orange Book ("Approved Drug Products with Therapeutic Equivalence Evaluations") (10).

### Objective of the act

FDA publishes patent information on approved drug products in the Orange Book

Maintaining list of patents which would be infringed.

Only Bioavailability studies and not clinical trials needed for approval.

Para I, II, III and IV certifications

Data exclusivity period for New Molecular Entities.

Extension of the original patent term.

The "Bolar" Provision (10)

**Recent additions to the Hatch-Waxman Act Under the "Medicare Prescription Drug and Modernization Act", 2003**

Non-extension of the 30-month period

Time limit for informing patent owner.

Provision for allowing declaratory judgment.

Benefit of exclusivity for several ANDAs filed on same day allowed (10)

ANDA certification clauses

ANDA has four types of the Submissions. ANDA applicants must certify to each patent for the Reference Listed Drug

Paragraph I – patent not submitted

Paragraph II – patent has expired

Paragraph III – date patent will expire

Paragraph IV – patent is invalid or will not be infringed

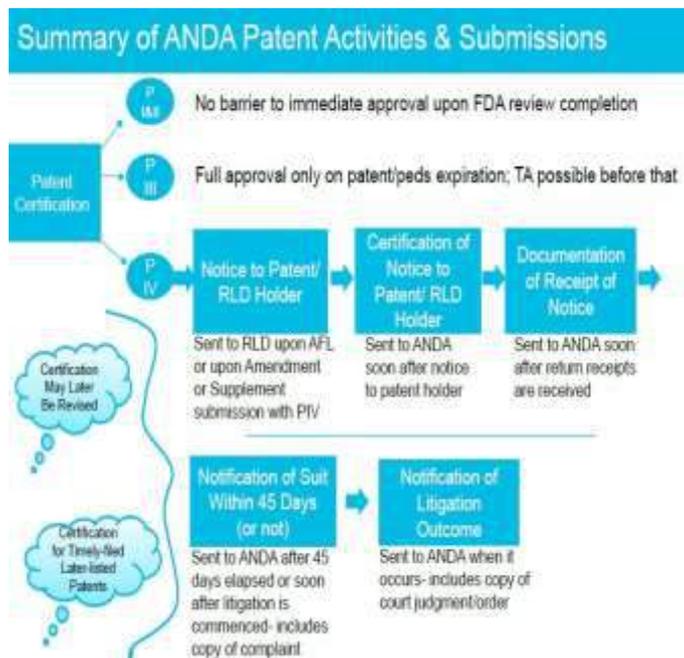
(11)

### Requirements for successful Para –IV

Strong technical expertise to understand the technical intricacies of the patents

Expertise in IPR to decide how to challenge the patents

Strong financial background to meet the litigation cost (11)

**Figure 5. Overview of paragraphs I to IV(11)****REFERENCES**

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# THE EFFECT OF FINANCIAL PERFORMANCE ON SHARE RETURN WITH COMPANY SIZE AS MODERATED VARIABLES

(Empirical Study of Property, Real Estate, and Building Construction Companies that went public in the Kompas 100 Index 2013-2018)

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## ABSTRACT

*The purpose of this study are as follows: 1) To examine the effect of ROA on Stock Returns; 2) To assess the effect of CR on Stock Returns; 3) To assess the effect of DER on Stock Returns; 4) To examine the effect of PER on Stock Returns; 5) To assess the effect of PBV on Stock Returns; and 6) To assess the extent to which Company Size can moderate the relationship between ROA, CR, DER, PER, PBV and Stock Return. This type of research used in this study is a casual associative research (causal associative research). The population in this study are property, real estate, and building construction companies that are included in the Kompas 100 index which are listed on the Indonesia Stock Exchange during 2013-2018. Sample selection with purposive sampling method. The analytical method used to test the hypothesis is multiple regression analysis with the absolute difference test. The results showed that: 1) ROA has a positive effect on stock returns; 2) CR does not have a significant positive effect on stock returns; 3) DER has a positive effect on stock returns; 4) PER has a positive effect on stock returns; 5) PBV has no effect on stock returns; and 6) Company size is not able to moderate the relationship between ROA, CR, DER, PER, PBV with stock returns.*

**KEYWORDS:** *Return On Assets, Current Ratio, Debt to Equity Ratio, Price Earning Ratio, Price to Book Value, Company Size, Stock Return*

## INTRODUCTION

One of the things that becomes a benchmark for a country's economic development is the level of world capital market development and securities industries in that country. The capital market acts as a means to mobilize funds from parties who have excess funds to those who need funds. The presence of the capital market increases the choice of sources of funds and investment choices for investors, so that the opportunity to obtain greater returns in accordance with the characteristics of the selected investment. According Jogiyanto (2015) investment activity itself is an activity of placing funds in one or more assets during a certain period in the hope of earning income or an increase in the value of the initial investment (capital) which aims to maximize

the expected return (return) within the risk limit acceptable to every investor.

The main conditions desired by investors to be willing to channel their funds through the capital market are a feeling of security of the investment being invested and the level of return that will be obtained from the investment. This feeling of security is obtained among others because investors obtain clear, reasonable and timely information as a basis for making investment decisions. Return is also the return obtained by the investor for his decision to bear the risk of the investment made, because the capital market cannot provide guarantees to investors to obtain a certain Stock Return.

Stock Return is an expected rate of return on investments made in shares or groups of shares through a portfolio. The good financial performance



of a company is a major consideration for investors. The better the level of financial performance of a company is expected to increase stock prices and will provide profits (return) for investors, because Stock Return is the difference between the current stock price and the previous stock price. High Stock Return is one of the attractions for investors to invest their funds in the capital market. Thus, if the company's ability to generate profits increases, the share price will also increase. Husnan (2005 in Bisara, 2015) the higher the return or profit obtained, the better the position of the company owner.

Stock Return is a factor that influences investors' interest to make an investment in a company, with the high rate of return given by the company to investors, it shows that the company has a good company performance, so investors believe that the company will have a positive effect of shares that have been invested by investors in the capital market. This situation requires sufficient funding for companies to survive and compete. One of the ways taken by companies to meet funding needs to develop in order to remain competitive is the sale of company shares to the public through the capital market. With more and more investors investing in the capital market, it will increase the value of the company, because with the number of investors who trust the company, it means the company can use its assets efficiently, so that the company's stock price will increase and the company's stock return will also increase.

Shares of companies that go public as investment commodities are classified as having a high level of risk because they are very sensitive to changes in political and economic conditions and changes that occur within the company itself. These changes can have a positive or negative impact on the company's stock price. This shows that investors need to take a cautious attitude in investing in the form of shares to prevent possible losses to be received. One of the efforts to prevent these losses is to predict the Stock Return that investors might receive in the future. Stock Return Prediction can be done by analyzing the company's performance. One of the main things that is often used to analyze company performance is by analyzing the company's finances. Corporate financial analysis requires several benchmarks. Benchmarks that are often used are financial ratios or indexes that connect two financial data with one another.

Financial ratio analysis is based on historical financial data whose main purpose is to give an indication of the company's future performance. Financial ratio analysis is an alternative to test whether financial information generated by corporate financial accounting is useful for classifying or predicting stock returns on the capital market. With financial ratio analysis, it can be seen the strengths

and weaknesses of companies in the financial sector. Investors before investing in companies listed on the IDX conduct an analysis of company performance including using financial ratios to determine the company's stock returns. Investors will utilize all the information and financial performance of the company against prices in making buying or selling decisions so that the shares now reflect all known information.

According to Kasmir (2010) financial ratios are the activities of comparing numbers in financial statements by dividing one number with another number. Comparisons can be made between one component with components in one financial statement or between components that exist between financial statements. With financial ratio analysis, information can be obtained and provide an assessment of the financial condition of a company in a certain period. According to Wild and Subramanyam (2010), financial ratios consist of profitability, liquidity, solvency, activity and market ratios.

Some research on financial performance that has been linked to Stock Returns has been carried out but indicated inconsistent results. Research conducted by Bintara & Tanjung (2019) shows that Stock Return is influenced by several factors, namely return on assets (ROA), current ratio (CR), debt to equity ratio (DER), and price earning ratio (PER). Whereas the research of Nesa (2015) shows that only ROA and DER have a significant effect on stock returns.

The inconsistency of the results of previous studies prompted researchers to add company size as a moderating variable in the relationship between financial performance and Stock Return, which later this moderating variable could strengthen or weaken the relationship between financial performance and Stock Return. Company size is the scale of the company used to reflect the size of the company based on total company assets (Puspitasari and Latrini, 2014). The size of the company is also an assessment of whether the company can use its assets well to generate profits or profits. Investors will be more confident of large-sized companies to invest their excess funds, because with large-sized companies make investors more confident to entrust their business continuity to be more secure and very unlikely bankruptcy will occur rather than investing in small companies (Mayuni and Suarjaya 2018).

In research conducted by Surgawati, et al., (2019), Pohan, et al., (2018) and Mudjijah, et al., (2019) which states that company size is able to moderate the relationship between independent and dependent variables. This statement is different from the results of research by Yuliasari, et al (2019) and Apriliyanti, et al., (2019) which states that company



size cannot moderate the relationship between independent and dependent variables.

Researchers chose the property, real estate and building construction company because property, real estate and building construction companies play an important role in the field of economy and development in Indonesia. This sector is also one indicator to assess a country's economic development.

Based on the description above, the authors are interested in conducting a study entitled "Effect of Financial Performance on Stock Returns with Firm Size as Moderation Variables (Empirical Study of Property, Real Estate, and Building Construction Companies that go public in Kompas 100 Index 2013-2018)".

From the description of the research background above, it can formulate the main issues that will be discussed in this study, namely: 1) Does ROA affect the Stock Return; 2) Does CR affect the Stock Return; 3) Does DER affect the Stock Return; 4) Does PER affect the Stock Return; 5) Does PBV affect the Stock Return; and 6) Whether Company Size can moderate the relationship between ROA, CR, DER, PER, PBV and Stock Return.

## LITERATURE REVIEW

### Pecking Order Theory

According to Brearley, Myers and Marcus (2008 in Sukarno et al, 2016) the pecking order theory states that companies like internal funding (ie profits, retained and reinvested) rather than external funding. If external funding is needed, they would rather issue debt than issue new shares. Debt issuance is still considered to have a small impact on stock prices and the scope of debt valuation is smaller because debt issuance is a sign that is not too alarming for investors. These observations triggered the pecking order theory of capital structure which reads as follows: 1) Companies like funding from internal, because these funds are collected without sending reverse signals that can reduce share prices. 2) If external funds are needed, the company issues the debt first and only issues equity as a last resort. This Pecking order arises because debt issuance is not too translated as a bad sign by investors when compared to equity issuance.

### Stakeholders Theory

According to Clarkson (1995) in Hasian (2017), stakeholders are divided into two groups, namely primary and secondary. Primary stakeholders are groups of stakeholders who do not take part or participate in the operations of a company. Secondary stakeholders are groups of stakeholders who influence and are influenced by the company, but are not involved and are not so important for the survival of the company.

Stakeholder theory is a theory that states that a

company is an entity that not only operates for its own interests, but must provide benefits to all its stakeholders, because the survival of a company is supported by stakeholders (Ghazali and Chariri, 2007 in Hasian, 2017). Shareholders, creditors, consumers, suppliers, the government, the public, analysts, and other parties are stakeholder groups that are considered by the company to disclose or not reveal information in the company's financial statements. All stakeholders have the right to obtain information about company activities.

### Financial performance

An assessment of a company's financial performance is defined as Performing Measurement, which means that the company's qualifications and efficiency or effectiveness in operating a business during the accounting period. So it can be interpreted that performance is a formal effort carried out by the company to evaluate the efficiency and effectiveness of the company's activities that have been carried out in a period of time. So it can be concluded to assess the financial performance of companies can use a certain measure or benchmark. Usually the measure used to measure a company's financial performance is a ratio or index that links two or more financial data.

According to Robert Ang (1997) in Nita and Silviana (2016), financial analysis is reflected in financial ratios consisting of five ratios, namely: a) Solvency Ratios; b) Market Ratio; c) Profitability Ratio; d) Liquidity Ratio; e) Activity Ratio.

In this study, fundamental analysis will be reflected by the financial ratios proxied by:

#### a. Return On Asset (ROA)

ROA is one ratio that measures the level of profitability of a company. ROA is used to determine the amount of net profit that can be obtained from the company's operations using all of his wealth. High and low ROA depends on the management of company assets by management that illustrates the efficiency of the company's operations. The higher the ROA the more efficient the company's operations and vice versa, the lower ROA can be caused by the number of company assets that are unemployed, investments in excess inventory, excess paper money, fixed assets operating below normal and others occur on the stock exchange (Teguh, 2014). ROA is obtained from the comparison of net income with the company's total assets.

Investors will like a company with a high ROA value because a company with a high ROA value can produce a greater profit level than a company with a low ROA value (Ang, 1997 in Teguh, 2014). The higher the value of ROA, the better the company's performance on the use of its assets.

Based on Bank Indonesia Circular Letter



No.13 / 24 / DPNP dated 25 October 2011 (Hafidz and Safira, 2018). Return On Assets can be calculated using the formula:

$$ROA = \frac{\text{Laba Sebelum Pajak}}{\text{Rata - rata Total Aset}}$$

#### b. Current Ratio (CR)

The most common ratio used to analyze the working capital position of a company is the current ratio, which is the ratio between the amount of current assets and current debt (Munawir, 2005 in Nesa 2015). A high CR provides a good indication of collateral for short-term creditors in the sense that at any time the company has the ability to pay off its short-term financial obligations. However, a high CR also indicates that some working capital is not spinning or unemployed and will negatively affect the ability to earn profit / profitability (Nesa, 2015). The reduced ability of the company to earn profits will also cause a decrease in the returns that will be obtained by investors. The formula for calculating CR according to Gitman & Zutter (2012) is:

$$CR = \frac{\text{Current Assets}}{\text{Current Liabilities}}$$

#### c. Debt to Equity Ratio (DER)

DER is a ratio that illustrates the ratio of debt and equity in company funding and shows the ability of the company's own capital to meet all its obligations (Sawir, 2000 in Nesa 2015). According to Susilowati & Turyanto (2011) the greater use of debt, which is reflected by the greater debt ratio (ratio of debt to total assets), the same earning before interest and tax (EBIT) will result in greater earnings per share. If earnings per share increase, investor interest will also increase. This will have an impact on increasing share prices and causing an increase in stock returns. The formula of Debt to Equity Ratio (DER) according to Husnan (2015) is

$$DER = \frac{\text{Total Kewajiban}}{\text{Modal Sendiri}}$$

#### d. Price Earning Ratio (PER)

PER is a ratio that compares the price of shares obtained from the capital market and earnings per share obtained by company owners presented in the financial statements (Wahyudiono, 2014). According to Sugiono (2009) the higher the PER ratio will indicate that the company's performance is also getting better. But on the contrary, if the PER is too high it can

also indicate that the stock price offered is already very high or irrational. Caution is needed in analyzing PER because the analysis can be misleading. The formula used to calculate the amount of PER according to Husnan (2015) is:

$$PER = \frac{\text{Harga Saham}}{\text{Laba per lembar saham}}$$

#### e. Price to Book Value (PBV)

According to Darmadji & Fakhruddin (2001) PBV illustrates how much the market values the book value of a company's shares. If PBV is high, market confidence in the company's prospects going forward is also high. PBV ratio is usually used for investors in making investment decisions. The higher the PBV, the higher the share price. The higher the stock price, the higher the stock return will be. This ratio is calculated using the following formula (Robert, 1997):

$$PBV = \frac{\text{Harga pasar per lembar saham}}{\text{Nilai Buku per lembar saham}}$$

#### Stock Return

Stock return or stock return is one of the most important aspects in conducting investment analysis. Stock return is the level of profit that an investor will enjoy on an investment he does. The magnitude of stock returns can be seen from the existence of abnormal returns obtained by investors relating to the stock churning event.

Abnormal return is the difference between actual returns and expected returns. A positive abnormal return indicates that the return received is greater than the expected return, on the contrary if the return received is smaller than expected then it is called a negative abnormal return.

The abnormal return calculation in this study uses a market adjusted model, the market adjusted model. In this model assume that the best predictor for the return of a security is the market index return at that time. If the market index return at the time of announcement is 10% then the expected return of all securities at the same time is the same as the market index return of 10%. If the return of a security at the same time is 25%, the abnormal return for that security is 15% (Jogiyanto, 2015).

Some research on event studies also uses abnormal accumulation of returns. Accumulation of abnormal return or cumulative abnormal return (CAR) is the sum of the abnormal return of the previous day in the event period for each security (Jogiyanto, 2015).  $CAR_{Nn}$  is the daily accumulation of abnormal returns per share. The event period is determined by the researcher, which is 21 days, which is 10 days before and 10 days after the Internet



Financial Reporting.

**Company Size**

The size of the company is the size of the company, a large established company will have easy access to the capital market (Purnamasari & Fitria, 2015). Large companies are given more attention by the public so they will be more careful in doing financial reporting, so that the impact of these companies is reporting conditions more accurately.

The size of the company will be symbolized by SIZE, and measured using the natural logarithm (ln) of the book value of total assets owned by the company.

**Prior Research**

Previous research that can support this research is as follows: Nesa (2015) in her research entitled "Analysis of Factors Affecting Stock Return (Case Study in Automotive and Components Sub Sector Companies Listed on Indonesia Stock Exchange Period 2010-2014)". The results showed that only ROA and DER variables significantly influence Stock Return. While the current ratio (CR), price earning ratio (PER) and price to book value (PBV) have no effect on stock returns.

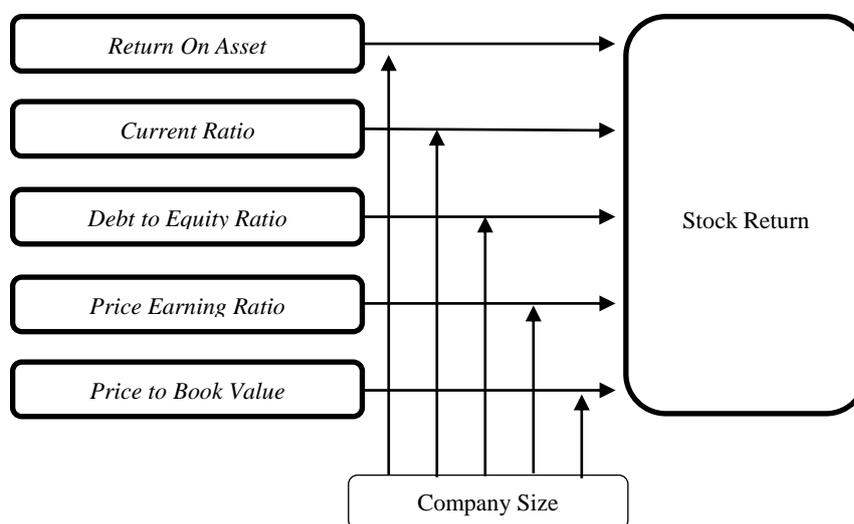
Vitri and Indra (2018) in their research entitled "Effect of Debt to Equity Ratio, Total Asset Turnover, Inflation and BI Rate on Stock Returns". The results showed that inflation and the BI rate had a significant effect on stock returns. Whereas Debt to Equity Ratio (DER) and Total Asset Turn Over (TATO) have no effect on Stock Returns.

Solihati (2019) in her research entitled "Analysis of Factors Affecting Abnormal Returns in the Private Banking Sector Registered in Indonesia Stock Exchange 2015-2017". The results of this study concluded that NPM, DR, and DER had no effect on Cumulative Absolute Return. While ROE has significant and significant effect on Cumulative Absolute Return.

Bintara & Tanjung. (2019) in his research entitled "Analysis of Fundamental Factors on Stock Return". The results of this study prove that 1) ROA has a positive effect on Stock Returns; 2) CR has a positive effect on Stock Returns; 3) DER has a negative impact on Stock Returns; 4) PER has a positive effect on stock returns; and 5) PBV does not affect Stock Return.

**Thought Framework**

Based on the theoretical foundation and previous studies, the researcher develops the research framework tested as shown in the following figure:



**Gambar 1.1 Rerangka Pemikiran**

**Hypothesis**

The research hypotheses proposed are as follows:

- Ha1 : Return On Assets affect Stock Return
- Ha2 : Current Ratio affects Stock Return
- Ha3 : Debt to Equity Ratio affects the Stock Return
- Ha4 : Price Earning Ratio affects Stock Return

- Ha5 : Price to Book Value influences Stock Return
- Ha6 : Company size can moderate the relationship between Return On Assets and Stock Return
- Ha7 : Company size can moderate the relationship between Current Ratio and Stock Return



- Ha8 : Company size can moderate the relationship between Debt to Equity Ratio and Stock Return
- Ha9 : Company size can moderate the relationship between Price Earning Ratio and Stock Return
- Ha10 : Company size can moderate the relationship between Price to Book Value and Stock Return

**RESEARCH METHOD****Types of Research**

The research used in this study is casual associative research (causal associative research). According to Sanusi (2011), associative-causal research is a research that seeks a relationship between two or more variables. The purpose of associative research is to look for relationships between one variable and another.

**Definition of Variable Operations**

Operational research variables on the Effect of Profitability, Capital Structure and Sales Growth on Stock Return can be summarized in table 1.1.

**Table 1.1 Operasionalisasi Variabel**

Jenis Variabel	Defenisi Operasional	Pengukuran	Skala
<b>Dependent</b>			
<i>Stock Return</i>	Profit enjoyed by investors for their stock investments (Jogiyanto, 2015)	$\sum_{t=-10}^{t=+10} AAR_{nt}$	Rasio
<b>Independen</b>			
<i>Return On Assets</i>	Ratios used to measure the effectiveness of management in generating profits with available assets (Gitman & Zutter, 2012)	$\frac{\text{Laba Sebelum Pajak}}{\text{Rata - rata Total Aset}}$	Rasio
<i>Current Ratio</i>	A ratio that measures the extent to which a company's current assets are used to meet its current liabilities.	$\frac{\text{Current Assets}}{\text{Current Liabilities}}$	Rasio
<i>Debt to equity ratio</i>	Comparison between all corporate debt both long-term debt and short-term debt with the company's own capital	$\frac{\text{Total Kewajiban}}{\text{Modal Sendiri}}$	Rasio
<i>Price Earning Ratio</i>	The ratio of the ratio between the share price to the income of each share, and is an indicator of the company's development or growth in the future (prospects of the firm).	$\frac{\text{Harga Saham}}{\text{Laba per lembar saham}}$	Rasio
<i>Price to Book Value</i>	Market ratio (market ratio) which is used to measure the performance of the stock market price to the book value.	$\frac{\text{Harga pasar per lembar saham}}{\text{Nilai Buku per lembar saham}}$	Rasio
<b>Moderating</b>			
Company Size	Large-scale small companies, an established large company will have easy access to the capital market (Purnamasari & Fitria, 2015)	Logaritma Natural Total Aset	Rasio

**Data Types and Sources**

The data used in conducting this research is secondary data, that is data obtained through intermediaries from both parties and certain media that support this research. The data used in this study are secondary data in the form of financial statements of property companies, real estate, and building construction which were listed on the IDX during 2013-2018 obtained from the Indonesia Stock Exchange website ([www.idx.co.id](http://www.idx.co.id)) and the site official of each of these companies.

**Research Population**

The population in this study are property, real estate, and building construction companies listed on the Indonesia Stock Exchange (IDX) in the period 2013-2018.

**Research Samples**

The sample is part of the population used to estimate population characteristics. The sampling technique is using purposive sampling technique. According to Widyani (2010) the purposive sampling method is the selection of samples on the basis of the suitability of the characteristics of the sample with the



specified sample selection criteria. The sample criteria used in this study are:

- 1) Property, Real Estate and Building Construction Companies listed on the Indonesia Stock Exchange (IDX) for the period 2013-2018.
- 2) Publish audited financial statements for the period 2013-2018
- 3) The company did not experience a loss during the study year.
- 4) Data owned by the company are complete and in accordance with the variables studied.

According to the criteria above, the number of samples used were 13 companies during the 6 periods namely 2013, 2014, 2015, 2016, and 2018. Then obtained a total sample of 13 companies x 6 periods = 78 data to be used in this study.

### Data Collection Technique

Data collection methods in this research are literature study and documentation methods. Literature study method by studying literature and reviewing a variety of literature literature such as various journals, articles and other literature books that support the research process. While the documentation method is the process of collecting data by recording documents related to this research.

### Analysis Method

#### Descriptive Statistics

Descriptive statistics in this study are used to provide a description of the character of the research variable using a frequency distribution table that shows the mode number, the range of scores and the standard division

#### Classic Assumption Test

This research was conducted with a simple regression analysis. The use of simple regression analysis must be free from testing classic assumptions. For this reason, before a simple regression analysis is required, classical assumptions must be tested first. Testing classic assumptions is

done using normality test, multicollinearity test, heterokedasticity test and autocorrelation test.

### Hypothesis Testing

In this study, researchers used five independent variables, one dependent variable and one moderating variable. There are three ways to test regression with moderating variables, namely the interaction test, the absolute difference test, and the residual test. In this study, researchers used the absolute value test. Because according to Furcot and Shearon (Ghozali, 2013) the absolute difference value test is more accurate. The step of the absolute difference test in this study can be described by the regression equation as follows:  $Y = \alpha + \beta_1 X_1 + \beta_2 X_2 + \beta_3 X_3 + \beta_4 X_4 + \beta_5 X_5 + \beta_6 X_6 + \beta_7 \text{Abs}(ZX_1 - ZX_6) + \beta_8 \text{Abs}(ZX_2 - ZX_6) + \beta_9 \text{Abs}(ZX_3 - ZX_6) + \beta_{10} \text{Abs}(ZX_4 - ZX_6) + \beta_{11} \text{Abs}(ZX_5 - ZX_6) + \epsilon$

#### Where :

Y = Stock Return

$\alpha$  = konstanta

$\beta$  = number or direction of the regression coefficient, which shows the number of increase or decrease in the dependent variable based on the independent variable

$X_1$  = Return on Asset

$X_2$  = Currents Ratio

$X_3$  = *Debt to Equity Ratio*

$X_4$  = *Price Earning Ratio*

$X_5$  = *Price to Book Value*

$X_6$  = Company Size

Abs = is an interaction that is measured by absolute value

$\epsilon$  = *error*

In this study the significance level ( $\alpha$ ) of 0.05 or 5% was used. This multiple regression analysis was carried out with the help of the SPSS (Statistical Package For Social Sciences) Release 25.0 for Windows program so that the coefficient of determination, the statistical F value and the statistical t value used in hypothesis testing can be obtained.



## RESEARCH RESULTS AND DISCUSSION

### Research Data Description

The following are descriptive statistical results about the research variables as follows:

**Table 1.2 Descriptive Statistics Results**

Variabel	N	Min	Max	Mean	Std. Deviation
Return On Assets	78	0,01	0,24	0,07	0,042
Current Ratio	78	0,65	17,72	2,19	2,157
Debt to Equity Ratio	78	0,28	5,37	1,63	1,212
Price Earning Ratio	78	1,95	80,17	14,89	10,557
Price to Book Value	78	0,23	7,41	1,67	1,203
Company Size	78	28,87	32,45	30,58	0,749
Stock Return	78	-0,01	0,02	0,0004	0,0054

Source: Primary data processed (2020)

Based on table 1.2 above, it can be presented descriptive statistical results about the research variables as follows: The average value of Return on Assets (ROA) is 0.07 or 7%, with a standard deviation of 0.042 or 4.2%, which means the data The amount used is highly fluctuating from 2013 to 2018. The variable ROA ranges from the lowest value of 0.01 (1%), namely the Sentul City Tbk company in 2015 to the highest value of 0.24 (24%), the Bekasi Fajar Industrial Estate company in 2013. The average value of ROA of 0.07 shows that for every Rp 1 of the funds invested by investors as share capital, will generate a net profit of 7%.

Current Ratio variable has an average of 2.19% with a standard deviation value of 2.157%, this shows that the data used fluctuate greatly from 2013 to 2018. Current Ratio variables range from the lowest value of 0.65 % ie the company Alam Sutera Realty Tbk. 2018 up to the highest value of 17.72%, namely the Bekasi Fajar Industrial Estate company in 2018.

Debt to Equity Ratio variable has an average ratio of 1.63% with a standard deviation value of 1.212%, this shows that the data used is highly fluctuating from 2013 to 2018. Debt to Equity Ratio variable ranges from the lowest value of 0 , 28%, namely Bekasi Fajar Industrial Estate company in 2014 up to the highest value of 5.37%, namely the company Adhi Karya (Persero) Tbk. Year 2014.

Price Earning Ratio variable has an average of 14.89% with a standard deviation value of 10.557%, this shows that the data used is highly fluctuating from 2013 to 2018. Price Earning Ratio variable ranges from the lowest value of 1.95% ie the company Surya Semesta Internusa Tbk in 2017 up to the highest value of 80.17%, namely the company Sentul City Tbk in 2014.

Price to Book Value variable has an average of 1.67% with a standard deviation value of 1.203%,

this shows that the data used fluctuated greatly from 2013 to 2018. Price to Book Value variables ranged from the lowest value of 0.23 % namely Lippo Karawaci Tbk company. in 2018 up to the highest value of 7.41%, namely the company PP (Persero) Tbk in 2014.

The average value of company size measured by natural logarithm of total assets is 30.58 trillion with a standard deviation value of 0.749 trillion, which means the data used is highly fluctuating from 2013 to 2018. Company size ranges from the lowest value of 28.84 trillion, namely the Bekasi Fajar Industrial Estate company in 2013 up to the highest value of 32.45 trillion, namely the Waskita Karya (Persero) Tbk company in 2018. The average value of the company size of 30.58 shows that the average sample company has asset stability amounting to 30.58 trillion.

The average value of the Stock Return Variable measured by Cumulative Abnormal Return (CAR) of 0.0004 with a standard deviation value of 0.0054, which means the data used is highly fluctuating from 2013 to 2018. Cumulative Abnormal Return ranges from the lowest value of -0.01, namely the Sentul City Tbk company in 2016 up to the highest value of 0.02, namely the Adhi Karya (Persero) Tbk company. in 2016. The average value of Cumulative Abnormal Return of 0.0004 shows that as many as 0.04% of companies received a positive market response from investors.

### Classic Assumption Test Normality test

Thus the overall results of the normality test percounatan using the Lilliefors test can be seen in the summary in table 1.3.

**Table 1.3 Summary of the Normality Test**

No	Taksiran	n	L <sub>Count</sub>	L <sub>Table</sub>		Keputusan
				$\alpha = 0,05$	$\alpha = 0.01$	
1	Y atas X1	78	-0,1064	0,1003	0,1167	Normal
2	Y atas X2	78	-0,1061	0,1003	0,1167	Normal
3	Y atas X3	78	-0,1126	0,1003	0,1167	Normal
4	Y atas X4	78	-0,1061	0,1003	0,1167	Normal
5	Y atas X5	78	-0,0970	0,1003	0,1167	Normal
6	Y atas X6	78	-0,1061	0,1003	0,1167	Normal

Source: Primary data processed (2020)

### Multicollinearity Test

The results of the autocorrelation test can be seen in Table 1.4. following.

**Table 1.4 Summary of Multicollinearity Tests**

Variabel	Collinearity Statistics	
	Tolerance	VIF
<i>Return On Assets</i>	0,445	2,246
<i>Current Ratio</i>	0,909	1,101
<i>Debt to Equity Ratio</i>	0,525	1,904
<i>Price Earning Ratio</i>	0,548	1,825
<i>Price to Book Value</i>	0,444	2,252
<i>Company Size</i>	0,791	1,264

Source: Primary data processed (2020)

### Autocorrelation Test

The autocorrelation test results can be seen in Table 1.5 below:

**Table 1.5 Autocorrelation test results**

Model	R	R Square	Adjusted R Square	Std. Error of the Estimate	Durbin-Watson
1	0,714 <sup>a</sup>	0,510	0,469	0,00395939	1,825

Source: Primary data processed (2020)

Based on SPSS output, the Durbin Watson statistical value is 1,825. While from the Durbin Watson table with  $n = 78$  and  $k = 6$ , the  $d$  table is obtained ie  $d_l$  (outer boundary) = 1.471 and  $d_u$  (inner limit) = 1.801 with a significance level of 5%,  $4-d_u = 2.199$ ; and  $4-d_l = 2,529$ ; then from accounting it is concluded that the DW-test is located in the test area. Referring to Ghozali (2010), the regression model in

this study is free from the autocorrelation problem because the Durbin Watson values are between  $d_u$  and 4  $d_u$ .

### Heteroscedasticity Test

The test results using the Spearman rank test can be seen in the following table 1.6:

**Table 1.6 Heteroscedasticity Test Results**

		X1	X2	X3	X4	X5	X6
Abres	Correlation Coefficient	-,058**	,055	,112	,054	-,166*	,117
	Sig. (2-tailed)	0,061	0,632	0,329	0,637	0,089	0,306
	N	78	78	78	78	78	78

Source: Primary data processed (2020)

Spearman rank test results in the table above shows the significance value of each variable of 0.061; 0.632; 0.329; 0.637; 0.089 and 0.306. Because the significance value of each variable is greater than 0.05, it can be concluded that the data are free from heteroscedasticity.

### Test the value of absolute difference

Analysis by testing the absolute difference value is carried out with the help of the SPSS (Statistical Package for Social Sciences) Release 25.0 for Windows program. From the data processing through



the SPSS program the following results were obtained:

**Table 1.7 Results of moderating variable regression analysis**

Keterangan	B	t <sub>table</sub>	t <sub>count</sub>	Sig	Adj R <sup>2</sup>	F <sub>count</sub>	Sig
(Constant)	- 0,020				0,480	7,463	0,000
X1	0,075	1.665	2,417	0,018			
X2	0,001	1.665	1,820	0,073			
X3	0,004	1.665	6,284	0,000			
X4	0,000	1.665	2,431	0,018			
X5	- 0,003	1.665	- 1,734	0,088			
X6	0,000	1.665	0,385	0,702			
AbsZX1-ZX6	- 0,001	1.665	- 0,547	0,586			
AbsZX2-ZX6	- 0,001	1.665	- 1,362	0,178			
AbsZX3-ZX6	0,000	1.665	- 0,392	0,697			
AbsZX4-ZX6	- 0,001	1.665	- 0,930	0,356			
AbsZX5-ZX6	0,001	1.665	0,621	0,537			

Source: Primary data processed (2020)

Based on the regression results above, an equation can be formed as follows:  $Y = -0,020 + 0,075X1 + 0,001X2 + 0,004X3 + 0,000X4 - 0,003X5 + 0,000X6 - 0,001Abs(ZX1-ZX6) - 0,001Abs(ZX2-ZX6) + 0,000Abs(ZX3-ZX6) - 0,001Abs(ZX4-ZX6) + 0,001Abs(ZX5-ZX6) + \epsilon$

From table 1.7 it is known that the adjusted R square value is 0.480. This means that 48% of Stock Return can be influenced by Return On Assets, Current Ratio, Debt to Equity Ratio, Price Earning Ratio, Price to Book Value, Company Size, AbsZX1-ZX6, AbsZX2-ZX6, AbsZX3-ZX6, AbsZX4-ZX6 and AbsZX5-ZX6, the remaining 52% (100% - 48%) is explained by other causes outside the model.

From the Anova test or the F test in table 1.7 above, the calculated F value is 7.463 with a significance probability that indicates 0,000. Test probability values are much smaller than  $\alpha = 0.05$ . This shows that together (simultaneously) Stock Return can be influenced by Return On Assets, Current Ratio, Debt to Equity Ratio, Price Earning Ratio, Price to Book Value, Company Size, AbsZX1-ZX6, AbsZX2-ZX6, AbsZX3-ZX6, AbsZX4-ZX6 and AbsZX5-ZX6.

### Hypothesis test

#### Effect of Return on Assets on Stock Return

Based on the calculation results in table 1.7 above shows that the Return on Assets variable has a positive effect on Stock Return, which can be seen from the comparison between ttable and tcount, ie

ttable is smaller than ttest, with a table value of 1.665 and ttt 2.417 and a significance level smaller than 0.05. Thus Ha1 received.

#### Effect of Current Ratio on Stock Return

Based on the calculation results in table 1.7 above shows that the Current Ratio variable does not have a significant positive effect on Stock Return, which can be seen from the comparison between ttable and tcount, which is smaller than ttest, with a ttable value of 1.665 and ttest 1.820 and a greater significance level from 0.05. Thus Ha2 rejected.

#### Effect of Debt to Equity Ratio on Stock Return

Based on the calculation results in table 4.6 above shows that the Debt to Equity Ratio variable has a positive effect on Stock Return, which can be seen from the comparison between ttable and tcount, which is ttable smaller than tcount, with a ttable value of 1.665 and tcount 6.284 and a significance level that is located below 0.05. Thus Ha3 received.

#### Effect of Price Earning Ratio on Stock Return

Based on the calculation results in table 1.7 above shows that the Price Earning Ratio variable has a positive effect on Stock Return, which can be seen from the comparison between ttable and tcount, ie ttable is smaller than tcount, with a ttable value of 1.665 and ttest 2.431 and a level of significance that is at below 0.05. Thus Ha4 received.



### **Effect of Price to Book Value on Stock Returns**

Based on the calculation results in table 1.7 above shows that the Price to Book Value variable has a significant negative effect on Stock Return, which can be seen from the comparison between  $t_{table}$  and  $t_{count}$ , which is  $t_{table}$  smaller than  $t_{count}$ , with a  $t_{table}$  value of 1.665 and  $t_{count}$  -1.734 and the level significance is above 0.05. Thus  $H_{a5}$  was rejected.

### **Company size can moderate the relationship between Return On Assets and Stock Return**

Based on the calculation results in table 1.7 above it can be seen that the  $t_{count}$  AbsZX1-ZX6 (moderator) = -0.547 with a significance of 0.586. This means that company size cannot strengthen / weaken the relationship between Return On Assets and Stock Return because the direction is negative and the value of AbsZX1-ZX6 (moderator) is smaller than  $t_{table}$ . Thus  $H_{a6}$  was rejected.

### **Company size can moderate the relationship between Current Ratio and Stock Return**

Based on the calculation results in table 1.7 above it can be seen that the  $t_{count}$  AbsZX2-ZX6 (moderator) = -1.382 with a significance of 0.178. This means that company size cannot strengthen / weaken the relationship between Current Ratio and Stock Return because the direction is negative and the value of AbsZX2-ZX6 (moderator) is smaller than  $t_{table}$ . Thus  $H_{a7}$  was rejected.

### **Company size can moderate the relationship between Debt to Equity Ratio with Stock Return**

Based on the calculation results in table 1.7 above it can be seen that the  $t_{count}$  AbsZX3-ZX6 (moderator) = -0.392 with a significance of 0.697. This means that company size cannot strengthen / weaken the relationship between Debt to Equity Ratio with Stock Return because the direction is negative and the value of AbsZX3-ZX6 (moderator) is smaller than  $t_{table}$ . Thus  $H_{a8}$  was rejected.

### **Company size can moderate the relationship between Price Earning Ratio and Stock Return**

Based on the calculation results in table 1.7 above it can be seen that the  $t_{count}$  AbsZX4-ZX6 (moderator) = -0.930 with a significance of 0.356. This means that company size cannot strengthen / weaken the relationship between Price Earning Ratio

and Stock Return because the direction is negative and the value of AbsZX4-ZX6 (moderator) is smaller than  $t_{table}$ . Thus  $H_{a9}$  was rejected.

### **Company size can moderate the relationship between Price to Book Value and Stock Return**

Based on the calculation results in table 1.7 above it can be seen that the  $t_{count}$  AbsZX5-ZX6 (moderator) = 0.621 with a significance of 0.537. This means that company size cannot strengthen / weaken the relationship between Price to Book Value and Stock Return because the direction is negative and the value of AbsZX5-ZX6 (moderator) is smaller than  $t_{table}$ . Thus  $H_{a10}$  was rejected.

## **DISCUSSION**

### **Effect of Return on Assets on Stock Returns**

From the results of the study note that Return On Assets has a positive effect on Stock Return. This shows that the better the company's financial performance, the higher the stock returns. The results of this evidence show that companies with good or increasing returns on assets have the potential to attract investors to the company. This condition makes the company's stock price increase so that the increase in return on assets will have an impact on the company's stock return.

Return On Assets (ROA) is used to measure the effectiveness of a company in generating profits by utilizing its assets. Increased ROA means that the company's performance is getting better and will be responded by the market and investors by buying shares, as a result the company's stock price is increasing. With the increase in stock prices, the company's stock returns are also increasing, the theory is supported by signal theory which is a guide for investors to assess the company's prospects.

These results support research conducted by Farkhan & Ika (2012), Bramantyo and Daljono (2013), Bintara (2015), Nesa (2015), and Heryanto (2016) which states that the Return on Assets variable has a positive effect on the company's stock returns. However, the results of this study are not in line with research conducted by Yeye (2011), Arista & Astohar (2012), Widyawati (2012), and Thrisye & Simu (2013) which states that ROA has no effect on stock returns.

### **Effect of Current Ratio on Stock Return**

From the results of the study note that the Current Ratio has not a significant positive effect on Stock Return. The results of this study indicate that if the better the current ratio reflects the more liquid the company is, so that the ability to meet its short-term capabilities is higher, this will be able to increase the



company's credibility in the eyes of investors so that it will be able to increase the company's stock return.

Current ratio shows the amount of current liabilities covered by assets that are expected to be converted into cash in the short term. The higher the current ratio, it can be said that the company has greater ability to meet its short-term financial obligations. This is supported by the balance theory which states that companies with low business risk use more debt, and use less debt at high risk.

The results of this study do not support the findings of Shandy (2013), Pinkan (2013), Awan (2014), Ayu and Gede (2016) which state that Current Ratio has an effect on Stock Return.

### **Effect of Debt to Equity Ratio on Stock Return**

From the results of the study note that Debt to Equity Ratio has a positive effect on Stock Return. This indicates that if the company's burden is getting higher, the company's performance is getting better and this has an impact on raising stock prices in the capital market. With the increase in the company's stock price in the capital market, the return also increases.

Debt to equity ratio (DER) can provide an overview of the capital structure owned by the company so that it can be seen the level of risk of unpaid debt. The greater the debt to equity ratio, indicating the greater the company's burden on outsiders, both in the form of principal and interest on the loan. The statement is supported by a trade off theory in which a capital structure states that companies exchange tax benefits from debt financing with problems arising from potential bankruptcy.

The results of this study support the findings of Susilowati and Tri (2011), Acheaphong et. al (2014), Basalama et. Al (2017), and Bintara & Tanjung (2019), which shows that Debt to Equity Ratio has a positive effect on stock returns. However, the results of this study are not in line with research conducted by Arista & Astohar (2012) Gilang (2012), Thrisye & Simu (2013), Barakat (2014) and Ayu & Gede (2016), which state that DER has a negative and significant influence on stock returns.

### **Effect of Price Earning Ratio on Stock Return**

From the results of the study note that the Price Earning Ratio variable has a positive effect on Stock Returns. This indicates that if the stock price gets higher, the difference between the share price of the current period and the previous period will be greater, so that capital gains will also increase, so a high PER will cause stock returns to rise.

Price Earning Ratio (PER) is used by investors to predict the company's ability to generate profits in the future. The higher the PER, the higher the share price is valued by investors on the earnings per share, so the higher PER also indicates the more expensive the shares are towards their earnings. This assumption is supported by signal theory where companies with very bright prospects do not finance through new shares, while companies with poor prospects do like funding with outside equity which causes stock prices to rise.

The results of this study support the findings of Farkhan & Ika (2012), Malintan (2012), Aras (2014), and Ayu & Gede (2016) which states that PER has a positive and significant effect on stock returns.

### **Effect of Price to Book Value on Stock Returns**

From the results of the study note that Price to Book Value has no effect on Stock Return. These results support research conducted by Mathilda (2012), and Nesa (2015) this is because investors no longer think that PBV can be used as a benchmark for buying shares but rather consider other things. But these results are not in line with research conducted by Hardiningsih (2002), Margaretha & Damayanti (2008), and Arista & Astohar (2012) which state that PBV has a positive and significant effect on stock returns.

### **Company size can moderate the relationship between return on assets and stock returns**

The results showed that company size was not able to moderate the relationship between return on assets and stock returns. This means that the size of the company does not significantly cause the relationship between return on assets and stock returns to be stronger or weaker as previously thought. The return on asset ratio shows the company's ability to manage its assets to generate profits. A larger company is more flexible in managing its resources so that it can improve the company's financial performance. Large companies tend to be more recognized by the public and will increase trust in the products produced by the company.

The results of this study support the findings of Prasetyaningrum (2014), which states that company size is not able to moderate the relationship between profitability and stock returns.

### **Company size can moderate the relationship between Current Ratio and Stock Return**

The results showed that company size was not able to moderate the relationship between current



ratio and stock returns. This means that the size of the company does not significantly cause the relationship between the current ratio with stock returns to be stronger or weaker as previously thought.

This condition implies that a low CR is usually considered to indicate a problem in liquidity and is an early indicator of the company's inability to meet its short-term obligations. High CR, which means high liquidity also shows that companies are less able to manage money to create money, which in turn can reduce company profitability. Investors often assess that the greater CR shows the company's ability to meet its operational needs, especially working capital, which is very important to maintain the performance of the company's performance, which in turn affects stock price performance. This can provide confidence to investors to own the company's shares so as to increase stock returns.

#### **Company size can moderate the relationship between Debt to Equity Ratio with Stock Return**

The results showed that company size was not able to moderate the relationship between Debt to Equity Ratio with stock returns. This means that the size of the company does not significantly cause the relationship between Debt to Equity Ratio with stock returns to be stronger or weaker as previously thought.

Based on this, it can be explained by the inclusion of company size as a moderating variable that is not able to weaken or strengthen the positive influence of DER on stock returns. The larger the company, the DER effect in increasing returns is weakening. This is due to the greater size of the company, the risk obtained will decrease and the company's ability to generate returns will decrease along with the decrease of the level of risk. The results of this study are not in line with research conducted by Purwitajati & Putra (2016) which states that company size used as a moderating variable is stated to be able to moderate by weakening the positive influence of DER on stock returns.

#### **Company size can moderate the relationship between Price Earning Ratio and Stock Return**

The results showed that company size was not able to moderate the relationship between price earnings ratio and stock returns. This means that the size of the company does not significantly cause the relationship between the price earnings ratio with stock returns to be stronger or weaker as previously thought.

According to Harahap (2011), a high PER indicates investor expectations about the company's

achievements in the future are also high. This ratio is an indicator of how much investors are willing to pay how much per rupiah of reported profits. An increase in corporate profits can be characterized by an increase in share prices, which also has an impact on increasing the PER ratio.

#### **Company size can moderate the relationship between Price to Book Value and Stock Return**

The results showed that company size was not able to moderate the relationship between price to book value and stock returns. This means that the size of the company does not significantly cause the relationship between price to book value and stock returns to be stronger or weaker as previously thought.

According to Brigham and Houston (2010) the ratio of stock prices to the price of his book gives an indication of investors' views of the company. Companies that are considered good by investors can be interpreted as companies with safe profits and cash flow and continue to experience growth. Such companies will be sold at a higher book price ratio, compared to companies that have a low rate of return. The theory shows that the actual PBV ratio is not fully taken into account by investors, in purchasing shares. Because the greater PBV value indicates that the company has safe profits, secure cash flow and is in its infancy. So investors think that the company will be profitable to invest.

#### **CONCLUSION**

Based on the results of the analysis and discussion that has been done, the following conclusions can be drawn: 1) ROA has a positive effect on stock returns; 2) CR does not have a significant positive effect on stock returns; 3) DER has a positive effect on stock returns; 4) PER has a positive effect on stock returns; 5) PBV has no effect on stock returns; and 6) Company size is not able to moderate the relationship between ROA, CR, DER, PER, PBV with stock returns.

#### **Limitation**

This research is inseparable from the shortcomings and limitations. Limitations in this study are as follows: 1) Limited research uses independent variables, namely the variable Return on Assets, Current Ratio, Debt to Equity Ratio, Price Earning Ratio and Price to Book Value; 2) This research is only conducted by Property, Real Estate, and Building Construction companies, not yet able to represent all companies listed on the Indonesia Stock Exchange so that the results of this study will be able



to give different results if it is carried out on other types of companies.

### Suggestions

As explained earlier that this study contains limitations. But the results of this study can at least motivate further research. By considering the existing limitations, it is expected that future research will improve the following factors: 1) For companies should be able to increase profitability so that financial performance becomes good in the eyes of investors and can attract investors to invest; 2) In the next research, it is better to add several companies from various sectors that will be studied in order to better describe the condition of each company, researchers also need to add a longer research period so that the results can be generalized and add one or more variables that further affect stock returns ; 3) For investors and company management it is better to optimize return on assets, debt equity ratio, and price earning ratio, because these three variables have a positive and significant relationship to stock returns. In addition, especially for investors and investment managers in the decision to purchase shares in the capital market not only consider the ratio analysis approach in assessing the return of a stock, but also consider factors outside the company policy such as market conditions that occur as well as other external factors due to this will indirectly affect the benefits obtained in making investments.

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# **EFFECTS OF ELECTROMYOGRAPHY (EMG) BIOFEEDBACK TRAINING AND MIRROR THERAPY (MT) ON FUNCTIONAL RECOVERY OF HAND IN STROKE SURVIVORS: A COMPARATIVE STUDY**

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## **ABSTRACT**

**TITLE:** “Effects of Electromyography (EMG) Biofeedback Training and Mirror Therapy (MT) on Functional Recovery of Hand in Stroke Survivors: A Comparative Study”.

**DESIGN:** Convenient sampling method.

**SETTING:** Inpatient and outpatient of Department of Occupational Therapy, NILD, Kolkata.

**PARTICIPANTS:** A total of 30 stroke survivors with 10 in each group, AA group (Conventional OT only), AB group (Conventional OT with EMG biofeedback training) and AC group (Conventional OT with Mirror Therapy).

**INTERVENTIONS:** Treatment duration for all three groups is same. Each group receives occupational therapy intervention for 3 months, 3 sessions (each session will be 45 minutes) in a week. In AB group and AC group the subjects received 15 minutes of EMG biofeedback training and mirror therapy respectively in addition to 30-minutes of conventional occupational therapy.

**OUTCOME MEASURES:** Fugl -Meyer Assessment (FMA) – Upper Extremity and Action Research Arm Test (ARAT) are two outcome measures used.

**RESULT:** The current study has shown that EMG-BF training along with conventional occupational therapy resulted in significant improvement of hand function than mirror therapy with conventional occupational therapy and conventional occupational therapy alone.

**CONCLUSION:** The application of EMG-BF training along with conventional occupational therapy resulted in beneficial effects on functional recovery of hand in stroke survivors.

**KEY WORDS:** EMG, Biofeedback, Mirror Therapy, Stroke survivors.



## INTRODUCTION

Cerebral vascular accident (CVA) or stroke is a vascular acute neurological dysfunction caused by the interruption of blood flow to focal areas of the brain [1]. Stroke as the most common brain disorders is the third cause of death and its consequences continued more than 24 hours. The rate of stroke incidence is about 3 in 100,000 in 3rd and 4th decade of age which increases to 300 in 100,000 people during 8th and 9th decades. Long lasting and disabling consequences mark stroke as the third cause of death due to disease in the world [2].

Sequelae of stroke are often disabilities and global involvement interferes significantly with Activities of Daily Living (ADLs) [1]. Over 85% of stroke patients undergo hemiplegia and more than 69% among them experience functional motor disability of the upper extremities. Functional motor disability noticeably appears in the upper extremities rather than in the lower extremities [3]. The most common stroke related disorders are manifested as hemiplegia, imbalance, in-coordination and spasticity which are especially seen in upper extremities [2]. The upper limbs (UL) are very important to motor functionality and the effective handling, gripping and reaching capability required in most ADLs. Arm functions are impaired in 73-88% of CVA survivors, and 55-75% of them present hemiplegia, resulting in disabilities and restrictions to function [1].

Damage to the middle cerebral artery, which supplies much blood to the brain part in charge of the motor functions of the upper extremities and the hands. Slight recovery of the lower extremities enables functional gait, whereas in the recovery of upper extremity functions, recovery of minute functions (e.g., grasp and manipulation) and that of the distal parts is needed. As a result, the upper extremities look like they have recovered less than the lower extremities. Lang et al. noted that upper extremity motor disability significantly affects stroke patients' performance of activities of daily living, such as having a meal, wearing clothes, or washing one's face. Purposeful movements of the upper extremities require adjustment of the arms and hands, and stroke patients may extend the upper extremities after a stroke but have difficulty in grabbing objects, with considerably reduced manipulation ability and decreased ability to perform purposeful movements. The upper extremity functions of stroke patients play an important role in performing activities of daily living and in coming back to society; as a result, upper extremity functions have been emphasized as an important element in humans [3].

For the recovery of upper extremity functions in stroke patients, diverse treatment methods are being studied [3]. EMG biofeedback training and mirror therapy are two effective

treatment methods in rehabilitation that take pride of place in the recovery of these stroke survivors [1].

Biofeedback is an overlooked modality that therapist can use for neuromuscular re-education, relaxation techniques and behavioural modification. General term "Biofeedback" refers to those procedures or techniques that are used to provide an individual with an auditory or visual cue or feedback to learn and gain volitional control over a physiological response. Biofeedback equipment provides the individual with an external mechanism for monitoring a specific physiological function and response and through instant feedback, allows the individual to attempt to control or modify the behaviour or response. The primary use of biofeedback in rehabilitation field is in the form of sEMG or surface electromyography feedback for muscle re-education and training [4].

Mirror therapy (MT) may be a suitable alternative because of its low cost and simplicity. In MT, the patient sits in front of a mirror placed in the mid-sagittal plane. When looking into the mirror, the patient sees the mirror reflection of the intact limb as if it were the affected one. The movement of the intact limb gives the patient the illusion of which inputs are perceived through the affected limb behind the mirror. Substantial evidence has demonstrated the immediate efficacy of MT on motor recovery in people with stroke [5].

There are many studies conducted either on EMG biofeedback training or mirror therapy effectiveness on improving hand function in stroke survivors. But the present study is aimed at comparing the effectiveness of both the programmes to find out which one is better in improving hand function in stroke survivors. This type of study was not yet done in the past as per the search in the literature.

## AIM AND OBJECTIVES

### AIM

- To evaluate and compare the effectiveness of the EMG biofeedback training and mirror therapy on hand function in stroke survivors.

### OBJECTIVES

- To find out the effectiveness of the EMG biofeedback training on hand function in stroke survivors.
- To find out the effectiveness of the mirror therapy on hand function in stroke survivors.



## HYPOTHESIS

### EXPERIMENTAL HYPOTHESIS

The EMG biofeedback training is more effective than the mirror therapy in improving hand function or vice-versa in stroke survivors.

### NULL HYPOTHESIS

EMG biofeedback training and mirror therapy are equally beneficial in improving hand function in stroke survivors.

## MATERIALS AND METHODS

### METHODOLOGY

**Study type:** Comparative study

**Study area:** Inpatient and outpatient of Department of Occupational Therapy, NILD, Kolkata

**Study population:** Stroke Survivors

**Study period:** 12 months.

**Sample size:** 30 stroke survivors

**Sample Design:** Convenient sampling method with random allocation of stroke survivors recruited from DOT. Subjects are randomly allocated into 3 groups (AA, AB, AC) having 10 each.

AA Group: Conventional Occupational Therapy only

AB Group: Conventional Occupational Therapy with EMG biofeedback training

AC Group: Conventional Occupational Therapy with Mirror Therapy

[Total 30 slips were taken in which 10 slips were denoted with letters EMG, 10 slips with letter MT, and other 10 slips with OT, where letters EMG stands for Electromyography biofeedback, letters MT denotes Mirror Therapy and letters OT stands for Conventional Occupational Therapy only. All slips were mixed thoroughly in a container and then a lottery was drawn by the subjects (blind flooded) without replacement of slips. In doing so, we make sure that in successive drawings each of the remaining population had the same chance of being.]

**Study design:** Pre-test / post-test experimental design consisting of the comparison of hand function in stroke survivors, between the groups (AA-AB), (AA-AC) and (AB-AC)

➤ Action Research Arm Test (ARAT)<sup>[6,7,8]</sup>

### PROCEDURE

1. Informed consent was obtained from all participants.
2. Based on the inclusion criteria, 30 medically diagnosed stroke survivors was selected for the study and subjects was excluded based on the presence of other pathologies as found from the medical report and exclusion criteria.
3. A general evaluation was done including demographic data, history and functional outcome measures of stroke survivors.
4. As per baseline assessment by outcome measures the stroke survivors were allocated into 3 groups, having 10 in each, randomly using random number table for the study.
5. Each group receives intervention for 3 months, 3 sessions (each session will be 45 minutes) in a week.
6. After 3 months of intervention, a posttest was done using both outcome measures to know whether any improvement is there or not.

### INCLUSION CRITERIA <sup>[2, 13]</sup>

1. Stroke diagnosed by physician
2. At least six months passed from incidence of stroke
3. Both male and female subjects are selected
4. Age group 40 yrs to 60 yrs
5. Interested in participating in the study
6. No history of treatment by mirror therapy and biofeedback

### EXCLUSION CRITERIA <sup>[2, 5, 13, 14]</sup>

1. Modified Ashworth Scale > 2
2. MMSE < 21
3. Presence of accompanying disorders such as seizure, psychological disorders, hearing or visual problem, or orthopaedic disorders in upper extremities
4. Reflex Sympathetic Dystrophy
5. Severe Shoulder Subluxation
6. Subjects who have received botox injection or acupuncture within past 6 months to the affected upper extremity
7. Subjects taking anti-spasticity medication

### INTERVENTION

Treatment duration for all three groups is same. Each group receives intervention for 3 months, 3 sessions (each session will be 45 minutes) in a week. In AB group and AC group the subjects will receive 15 minutes of EMG biofeedback training and mirror therapy respectively in addition to 30-minutes of conventional occupational therapy,

### OUTCOME MEASURES

- Fugl -Meyer Assessment (FMA) – Upper Extremity<sup>[6,9,10]</sup>

whereas in AA group subjects receive only conventional OT for 45 minutes.

**AA Group: Conventional OT only** [2]

- Conventional occupational therapy includes:
  - Muscle stretching
  - Positioning
  - Facilitating normal patterns of movement

- Facilitator and inhibitory techniques
- Reflex inhibitory patterns
- Facilitating higher level reflexes
- Muscle tone normalization
- All conventional OT will remain same for both 2<sup>nd</sup> group (AB) and 3<sup>rd</sup> group (AC).



**Figure 10. Facilitating normal patterns of movement**

**AB Group: Conventional OT with EMG Biofeedback Training** [2, 3]

- In EMG biofeedback training, after stabilizing hand on the table with a hand-rest, electrodes will set on the bulk of wrist extensor muscles and lateral epicondyle of humerus.
- Patient will sit in front of monitor and watch the diagram of muscular contraction.

- By adjusting the threshold, if the patient could produce an activity in the extensor muscles above the threshold, music broadcasted from the machine.
- Therefore, he/she could receive appropriate feedback about contraction in the targeted muscle either in visual or auditory signals.
- The ground electrode that prevents electrical interference in the skin will attached to the distal ulna of the ipsilateral wrist.



**Figure 12. Electrode Positioning During EMG BF Training**

**AC Group: Conventional OT with Mirror Therapy** [1, 5, 15]

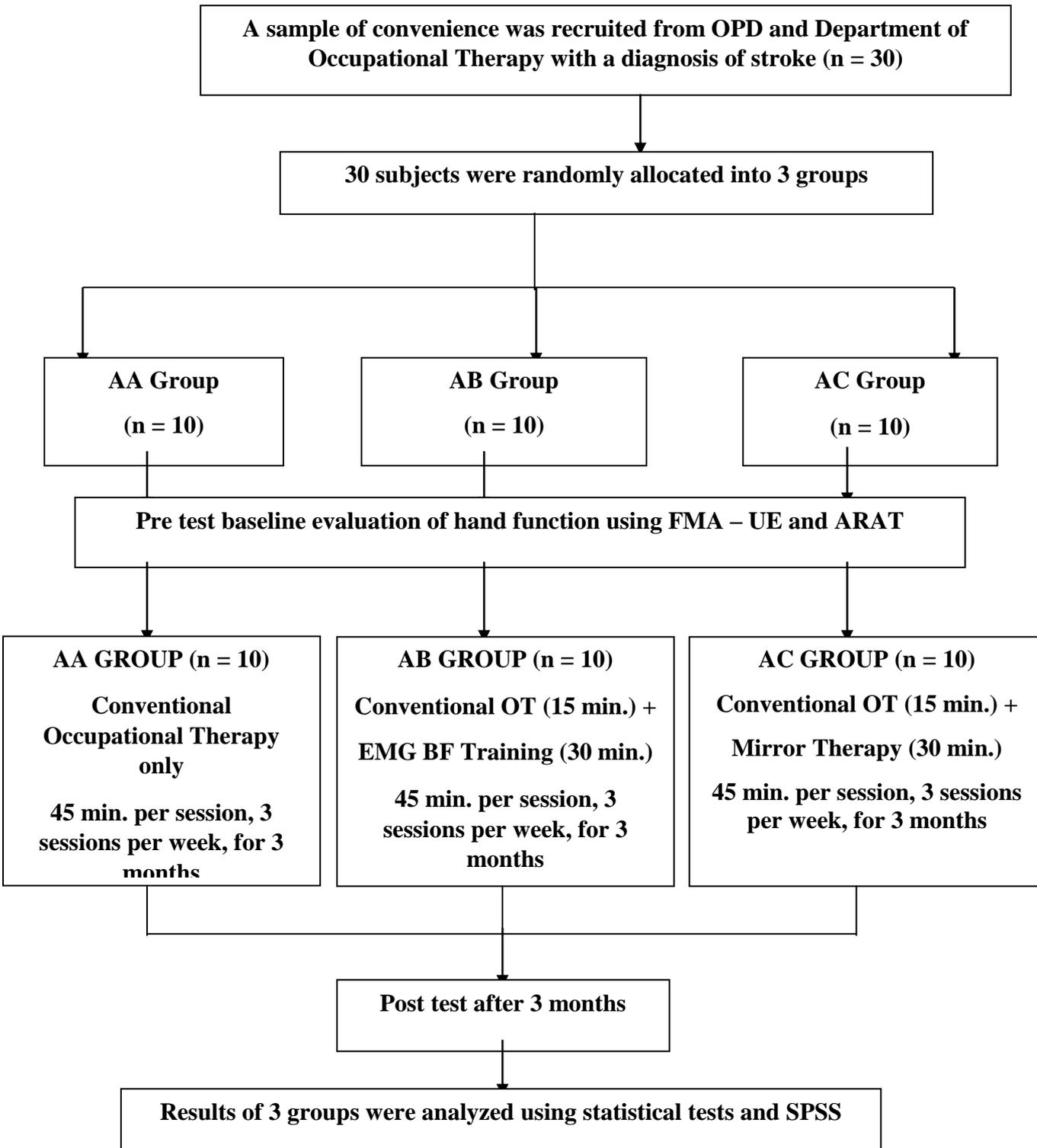
- The intervention was conducted within the regularly scheduled occupational therapy sessions.
- During the MT training, patient will sit close to a table on which a mirror is placed vertically.
- Affected upper limb will place behind the mirror and the unaffected upper limb will place in front of the mirror.
- Patients will orient to watch the reflection of their normal hand on the mirror as it is the affected one, and to perform activities bilaterally.
- Then participants will instruct to look at the reflection of the unaffected hand in the mirror as if it were the affected hand and perform bilateral symmetrical movements as much as possible.
- The activities consisted of
  1. Transitive movements, such as fine motor tasks of squeezing sponges, placing pegs in holes, or flipping a card,
  2. Gross motor tasks of reaching out to touch a switch or keyboard, and
  3. Intransitive movements, including the distal part movement of wrist repetitive extension-flexion or finger opponer and the proximal part movement of forearm pronation-supination.
- The functional tasks planned for the first phase will simple movements, such as forearm pronation-supination and wrist flexion-extension. For the second phase, the patients were asked to perform finger flexion-extension, counting numbers, tapping, and opposing. By the third phase, they were to take on simple manipulating tasks, such as picking up coins and beans, flipping over cards and collecting blocks in a bin. During the fourth phase, they moved on to more complicated tasks of plugging and unplugging pegboards, drawing simple figures, and coloring.



**Figure 15.Mirror Therapy Treatment**



**FLOW CHART**



(Flow chart showing the method of recruitment of patient in 3 groups)

**STATISTICAL ANALYSIS**

- SPSS version - 25 was used for statistical analysis.
- **Wilcoxon Signed rank test** was used for within group analysis for non parametric data.
- **Mann Whitney ‘U’ test** was used for the between group analysis for non parametric data.
- Level of significance was set at  $p < 0.05$  with 95% confidence interval.

**RESULTS****DESCRIPTIVE STATISTICS**

A total no of 30 subjects with stroke were enrolled in the study and all completed the study with 10 subjects each in 3 groups, AA group, AB group and AC group. The mean age of the subjects in AA group was 49.50 years (SD  $\pm$  4.905), in AB group was 51.10 years (SD  $\pm$  7.534) and in AC group was 48.80 years (SD  $\pm$  6.408). Total participant characteristics are shown in table No.2.

**Table 2. Demographic characteristics of stroke survivors in AA group, AB group and AC group.**

SL. NO.	BASELINE CHARACTERISTICS	AA GROUP	AB GROUP	AC GROUP
1	No. of subjects	10	10	10
2	Age range	40 – 60	40 – 60	40 – 60
3	Mean age (SD)	49.50 ( $\pm$ 4.905)	51.10 ( $\pm$ 7.534)	48.80 ( $\pm$ 6.408)
4	Sex ratio (M : F)	7 : 3	8 : 2	7 : 3
5	Mean FMA-UE (SD) (PRE-TEST)	61.70 ( $\pm$ 10.636)	61.00 ( $\pm$ 9.475)	59.20 ( $\pm$ 9.402)
6	Mean ARAT (SD) (PRE-TEST)	26.20 ( $\pm$ 5.329)	28.40 ( $\pm$ 5.562)	27.20 ( $\pm$ 7.815)

To find out whether the groups are homogeneous or not, a nonparametric test i.e. Mann-Whitney U test was used. The table below shows that

there was no significant difference between 3 groups which means the groups were homogeneous.

**Table 3. Shows equal distribution of stroke survivors in AA and AB, AB and AC, AA and AC.**

	AA & AB		AB & AC		AA & AC	
	Z VALUE	p VALUE	Z VALUE	p VALUE	Z VALUE	p VALUE
GENDER	-0.503	0.615	-0.503	0.615	0.000	1.000
AGE	-0.379	0.705	-0.722	0.470	-0.493	0.622
FMA UE	-0.114	0.909	-0.569	0.569	-0.947	0.344
ARAT	-1.103	0.270	-0.838	0.402	-0.076	0.939

The FMA-UE scale shows significant improvement in hand function in stroke survivors in all 3 groups having  $p < 0.05$  within group analysis by using Wilcoxon Sign Rank Test. One pretest and one posttest were done using the FMA-UE scale. **Table - 4** below shows significant improvement in hand functions within FMA-UE pretest (61.70  $\pm$  10.636) and FMA-UE posttest (62.50  $\pm$  10.575) in

AA group. The AB group shows significant improvement in hand function FMA-UE pretest (61.00  $\pm$  9.475) and FMA-UE posttest (79.40  $\pm$  6.535). Also the AC group shows significant improvement in hand function FMA-UE pretest (59.20  $\pm$  9.402) and FMA-UE posttest (60.70  $\pm$  9.238).

**Table 4. Comparison of pre and post test score of FMA-UE Scale in AA, AB and AC.**

GROUP		Z VALUE	p VALUE
AA GROUP	FMA-UE	-2.271	.023
AB GROUP	FMA-UE	-2.812	.005
AC GROUP	FMA-UE	-2.714	.007

The ARAT scale shows significant improvement in hand function in stroke survivors in all 3 groups having  $p < 0.05$  within group analysis by using Wilcoxon Sign Rank Test. One pretest and one posttest were done using the ARAT scale. Table - 5 below shows significant improvement in hand functions within ARAT pretest ( $26.20 \pm 5.329$ ) and

ARAT posttest ( $26.90 \pm 5.666$ ) in AA group. The AB group shows significant improvement in hand function ARAT pretest ( $28.40 \pm 5.562$ ) and ARAT posttest ( $38.80 \pm 5.692$ ). Also the AC group shows significant improvement in hand function ARAT pretest ( $27.20 \pm 7.815$ ) and ARAT posttest ( $28.80 \pm 7.772$ ).

**Table 5. Comparison of pre and post test score of ARAT Scale in AA, AB and AC.**

GROUP		Z VALUE	p VALUE
AA GROUP	ARAT	-2.121	.034
AB GROUP	ARAT	-2.825	.005
AC GROUP	ARAT	-2.549	.011

In Table - 6 between group analysis of FMA-UE scale and ARAT scale showed a statistically significant difference between AA and AB on post test ( $p = 0.001$ ,  $p = 0.001$  respectively), AB and AC

on post test ( $p = 0.000$ ,  $p = 0.008$  respectively). Whereas in AA and AC on post test ( $p = 0.405$ ,  $p = 0.649$  respectively), which implies statistically not significant.

**Table 6. Between group comparison of FMA-UE score and ARAT score in AA and AB, AB and AC, AA and AC.**

	AA & AB		AB & AC		AA & AC	
	Z Value	p Value	Z Value	p Value	Z Value	p Value
FMA-UE	-3.335	0.001	-3.524	0.000	-0.832	0.405
ARAT	-3.293	0.001	-2.652	0.008	-0.455	0.649

## DISCUSSION

The purpose of the present study was to determine the effects of 3 months of EMG-BF training with conventional occupational therapy and mirror therapy with conventional occupational therapy on functional recovery of hand in stroke survivors and to compare whether any of these interventions is more effective over the other.

The findings of the present study revealed that both the EMG-BF group and mirror therapy group improved the FMA-UE score and ARAT score, improved the functional outcome, which says that both the treatment programmes were effective in improving the hand function in stroke survivors.

The findings of the study were consistent with our experimental hypothesis, i.e. EMG-BF after stroke resulted in more beneficial effect on hand function as compared to mirror therapy and conventional occupational therapy.

**Comparison of FMA-UE score in AA (Conventional Occupational Therapy) group:** The result of the within group analysis shows that

there is a statistically significant improvement in UE and hand function post treatment FMA-UE score after 3 months  $p = 0.023$  having mean value pre-test ( $61.70 \pm 10.636$ ) and post-test ( $62.50 \pm 10.575$ ) suggests that there is no satisfactory improvement in hand function in conventional occupational therapy group post treatment.

**Comparison of FMA-UE score in AB (EMG-BF) group:** The result of the within group analysis shows that there is a statistically significant improvement in UE and hand function post treatment, FMA-UE score after 3 months  $p = 0.005$  having mean value pre-test ( $61.00 \pm 9.475$ ) and post-test ( $79.40 \pm 6.535$ ) suggests that there is satisfactory improvement in hand function in EMG-BF group post treatment.

The result of this study is supported by **Ju-Hong Kim** on 2017 who demonstrated that stroke survivors receiving intensive EMG biofeedback showed more significant upper extremity functional recovery than those who only received traditional rehabilitation therapy [3].



**Comparison of FMA-UE score in AC (Mirror Therapy) group:** The result of the within group analysis shows that there is a statistically significant improvement in hand function post treatment, FMA-UE score after 3 months  $p = 0.007$  having mean value pre-test ( $59.20 \pm 9.402$ ) and post-test ( $60.70 \pm 9.238$ ) suggests that there is mild improvement in UE and hand function in EMG-BF group post treatment. The result of this study is supported by **Ching-Yi Wu et al on 2013** who demonstrated the application of mirror therapy after stroke might result in beneficial effects on movement performance, motor control and temperature sense, but may not translate into daily functions in the population with chronic stroke [5].

**Comparison of FMA-UE score between AA (Conventional Occupational Therapy) and AB (EMG-BF) group:** The between group analysis of FMA-UE score showed a statistically significant difference between AA group and AB group on post-test  $p = 0.001$ . This result suggests that there is a significant difference in improvement of hand function in both the groups. The change in mean score of FMA-UE (pre score – post score) in AA group is 0.80 where as in AB group is 18.40. The difference in scores revealed that the improvement in hand function is quite better in AB group than AA group.

A study by **Tahereh Haji Ahmad et al on 2013** concluded that biofeedback trained group showed more decrease in spasticity, significant increase in ROM of elbow, wrist and fingers and significant increase in ADL performance. That's why biofeedback in accompanying with routine occupational therapy promised to be more effective in stroke survivors [2].

In our study, EMG biofeedback was used, which enhances hand function of hemiparetic limb promoting motor and functional recovery. In stroke survivors, initiating wrist and finger extension is often difficult because of the flexor synergy in the upper limb and are usually neglected when constituting individual rehabilitation due to its discouraging results in recovery, causing a social stigma but in our study EMG biofeedback training facilitates wrist and finger extensor activity to promote release of objects.

**Comparison of FMA-UE score between AB (EMG-BF) group and AC (Mirror Therapy) group:** The between group analysis of FMA-UE score showed a statistically significant difference between AB group and AC group on post-test  $p = 0.000$ . This result suggests that there is a significant difference in improvement of hand function in both the groups. The change in mean score of FMA-UE (pre score – post score) in AB group is 18.40 where

as in AC group is 1.50. So when compared to mirror therapy, it was concluded that the improvement in hand function is quite better in AB group than AC group.

**Comparison of FMA-UE score between AA (Conventional Occupational Therapy) and AC (Mirror Therapy) group:** The between group analysis of FMA-UE score showed a statistically insignificant difference between AA group and AC group on post-test  $p = 0.405$ . This result suggests that there is a mild significant difference in improvement of hand function in both the groups. The change in mean score of FMA-UE (pre score – post score) in AA group is 0.80 where as in AC group is 1.50. The difference in scores revealed that the improvement in hand function is very negligible in AC group than AA group.

In accord with previous studies and results, we found greater improvement in hand function in EMG-BF training measured by FMA-UE, than mirror therapy and conventional occupational therapy. Thus, **experimental hypothesis is proved and null hypothesis is rejected.**

**Comparison of ARAT score between AA (Conventional Occupational Therapy) and AB (EMG-BF) group:** The between group analysis of ARAT score showed a statistically significant difference between AA group and AB group on post-test  $p = 0.001$ . This result suggests that there is a significant difference in improvement of hand function in both the groups. The change in mean score of ARAT (pre score – post score) in AA group is 0.70 where as in AB group is 10.40. The difference in scores revealed that the improvement in hand function is significantly increased in AB group than AA group.

**Comparison of ARAT score between AB (EMG-BF) group and AC (Mirror Therapy) group:** The between group analysis of ARAT score showed a statistically significant difference between AB group and AC group on post-test  $p = 0.008$ . This result suggests that there is a significant difference in improvement of hand function in both the groups. The change in mean score of ARAT (pre score – post score) in AB group is 10.40 where as in AC group is 1.60. So when compared to mirror therapy, it was concluded that the improvement in hand function is quite better in AB group than AC group.

**Comparison of ARAT score between AA (Conventional Occupational Therapy) and AC (Mirror Therapy) group:** The between group analysis of ARAT score showed a statistically insignificant difference between AA group and AC group on post-test  $p = 0.649$ . This result suggests that there is a mild difference in improvement of hand function in both the groups. The change in



mean score of ARAT (pre score – post score) in AA group is 0.70 where as in AC group is 1.60. The difference in scores revealed that the improvement in hand function is not much noticeable in AC group than AA group.

It is very necessary to treat hand dysfunction problems in stroke survivors as the hand is the important key to ADL. Although mirror therapy and conventional occupational therapy treatments are one of the treatment strategies, we must consider EMG-BF training to treat more effectively and to achieve more improvement in functional recovery of hand.

## CONCLUSION

In this clinical trial, our findings suggests significant improvement in functional recovery of hand in stroke survivors when given EMG biofeedback training with conventional occupational therapy than mirror therapy with conventional occupational therapy and conventional occupational therapy alone. On the basis of the current results, it was also concluded that, the mirror therapy with conventional occupational therapy shows a noticeable better effects on paretic hand in compare to conventional occupational therapy only. But comparison between EMG-BF and mirror therapy revealed that positive effects of EMG-BF is more than mirror therapy.

Though the present study has a few limitations which could be further suggests for future study programmes however, it makes noteworthy contributions to the clinical aspect of treatment of stroke survivors.

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## **PROBLEMS AND COPING MECHANISMS OF THE ELDERLY: A STUDY OF ALIGARH, U.P**

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### **ABSTRACT**

*Population ageing, a universal and irrevocable process, is increasingly becoming a challenge for both developed and developing countries. This elderly population increase is due to improving health standards, eradication of deadly diseases and greater awareness of the importance of health. Such rapid changes have improved human longevity and decreased the rate of mortality. In India, the senior population above age of sixty has reached more than 8 per cent of the total population and it is expected to increase by three times accounting for 20 per cent population by 2050. This unprecedented growth has affected various aspects of the Indian social system, and has far reaching social, economic and political implications. The rapidly increasing elderly population, coupled with changing family structure and urbanization, has affected the lives of the elderly significantly. It is, therefore, necessary to examine the implications of these changes on the elderly population so as to create an awareness of the issues associated with ageing and their problems of adjustments within their own families and also within fast changing social environment.*

**KEY WORDS:** *Ageing, Elderly, Changing family structure, Problems, Coping mechanisms*

### **INTRODUCTION**

The biological function of age is generally considered in terms of the number of years people live, and, this is associated with the physical changes the body travels through over a period of time. But to consider age merely as a bio-physiological phenomenon is to view only one side of the coin. The other side of the coin which shapes and develops the mental and psychological aspects of human personality are the social norms and expectations that humans go through during the course of their lives. Apart from these factors, situational aspects such as gender, religion, race, caste, class and other life experiences tend to shape and nurture growth processes from infancy to adulthood and to old age.

Ageing may be viewed differently in different contexts due to its close association with biological, psychological and social processes. As Chadha (1999) puts it, at the individual level, ageing may be understood as a process of growing older which involves multidimensional changes in an individual's life. While biological ageing refers to physical changes in the body with the advancement of age, psychological ageing may be viewed in terms of an individual's adaptive capacities and subjective

reactions. Affective ageing refers to the reduced adaptive capacities of the individual in relation to changed environment, and with social ageing an individual experiences a change and decrease in meaningful social interactions.

Each society views old age in different ways, depending on its cultural attitudes which shape the way in which people look at old age. These attitudes, however, change over time. Portrayal of the elderly and their problems, thus, vary from society to society. Each culture has a separate set of expectations and assumptions about ageing. This, obviously, is a part of the socialization process which again differs from society to society. Negative cultural attitudes towards ageing and the elderly are not unknown. The elderly are also stereotyped and their characterization often seems biased.

Youth are generally glorified and associated with beauty, strength and confidence. On the other hand, the elderly are associated with grumpiness or hostility and, many a times ugliness. Similarly, while the progress of transition to adulthood is viewed with pride, the signs of natural ageing cause shame or embarrassment. The ageing persons themselves feel that with the decline of their physical beauty they will



be shunned by society. They, therefore, try to beautify themselves with cosmetic transformations. While many elderly people believe that ageing has made them feel stronger than what they were when they were young, yet, the socio-cultural situation in which they live may make them feel inconspicuous and worthless. Levy et al. (2002) reported that people are more likely to accept age based stereotypes more readily. Old people with positive self-perception are likely to have higher life expectancy as compared to people with low self-perception. Thus, ageing encompasses a number of physiological, socio-cultural and psychological challenges, and, even though advances in medical technology have lengthened life expectancies, it does not have the power to slow down the ageing process drastically or to prevent death.

Ageing is accompanied by different physiological, psychological and economic challenges and these challenges are aggravated by rapid changes in various aspects of social life. Population ageing is increasingly becoming a problem of both developed and developing countries. In India, the senior population above age of sixty has reached more than 8 per cent of the total population and it is expected to increase by three times accounting for 20 per cent population by 2050 (UNFPA, 2017). This rapid growth has affected various aspects of the Indian social system and have far reaching social, economic and political implications. The rapidly increasing elderly population, coupled with changing family structure and urbanization, has affected the lives of the elderly significantly. The elderly in India are confronted with different type of problems which vary according to their sex, socio-economic background, place of residence and health status (Siva Raju, 2011).

### **THE CHANGING FAMILY STRUCTURE IN INDIA**

The family in general and the joint family in particular has been an integral part of the Indian social organization. It has been the most preferred form of family in India as a regular source of security and support to all its members particularly elderly (Nasreen, 2010, Siva Raju, 2011). The role and status of the elderly was of prime importance. The oldest male member occupied and enjoyed the most privileged and powerful position in the joint family, while his wife was head of the younger women in the family (Bhat and Dhruvarajan, 2009). The elderly people were valued as reservoir of wisdom and their role in maintaining family values and intergenerational solidarity was highly acknowledged. There was a strong cultural emphasis on respect and care for the elderly and the authoritative position of the elderly was enhanced

and promoted by the social, economic and political values.

However, with the transition of Indian society from traditional to a more modern industrial society, the elderly population began to be dislodged from their previous position and became vulnerable to ageing process (Chadha, 1999, Vijaya Kumar, 1999, Nasreen, 2010, Mohapatra, 2011, Mane, 2016). With the onset of globalization, major transformations have taken place in social institutions and value system of Indian society. Specifically, the institution of family has undergone significant changes in its structure and functions. With high rates of urbanization and migration, the joint family system began to lose its traditional characteristics, especially because of greater job opportunities in urban areas. This led to the migration of youth from the villages to a different life in towns and cities and changed the nature of dependence of parents on their children as a long lasting support system during their old age (Bali, 1999, Bhat and Dhruvarajan, 2009, Ahmed-Ghosh, 2009, Shetter, 2013, Chakroborty and Bansod, 2014). The Joint family began to face a form of disintegration. But some of the collective values continued to prevail, and, as such, on many occasions, the young men and their families would return to their villages on festive and other important family occasions. By and large though, pressure of time and money and, sometimes, distances hindered the travel plans and physical distances, notwithstanding, led to emotional distances as well.

Life in urban areas brought in its own materialistic and individualistic values, and travel to foreign lands for studies and job opportunities also increased. These changes greatly affected not only the intergenerational relationships, but also the coping capacities of the younger and the older generations within the family.

Consequently, while some children decide to leave their old parents in the villages, others find it harder to shoulder the responsibility of providing regular support and care to their old parents living with them. High cost of living and health care made it more difficult to shoulder the responsibilities of parents both in rural and urban areas (Shetter, 2013). Emergence of dual career families has also affected status of the elderly. Involvement of women in outdoor activities is increasingly becoming problem for the elderly, particularly those elderly who need care due to their poor health. (Bhat and Dhruvarajan, 2009). However, elderly living in rural areas are in a better position than elderly living in urban areas (Mane, 2016).

Mohapatra (2011) observes that the dependency of the older parents on their children is quite prevalent in India but the pattern of communication and relationship are undergoing



significant changes. Such changes may be observed both in joint and nuclear families. The values and practices which helped the elderly to cope with the difficulties of ageing and ensured them security and care in their old age are vanishing at a faster rate specially in urban India. Weakening of intergenerational bonds and widening generation gap has resulted in increasing neglect and varied problems for the elderly. As indicated by studies like those of Siva Raju (2002) and Srivastava et al (2013), a significant number of elderly are subject to neglect and maltreatment, both physically and verbally, by their family members. Due to lack of time, younger generation finds it difficult to take care of elderly parents and fulfil their expectations which results in intergenerational conflict, abuse and neglect of elderly (Sebastian, 2010). A survey on elder abuse conducted by Help Age (2015) India indicates that almost half of the elderly in India suffer some form of abuse. The number of crimes against elderly is much higher in urban than rural areas. Female elderly are more vulnerable as more crimes are committed against elderly females than males. Surprisingly, about one-fourth of the crimes were committed by their family members (Patel, 2010).

Vasantha Devi and Premakumar (2000) while highlighting different problems associated with the elderly, pointed out that rural elderly face more health related problems than those residing in urban areas, due to illiteracy and low socio economic status. Similarly, elderly women also face more problems than men mainly for the same reasons. Ramchandran (2016) highlights the findings of a study conducted by Agewell Foundation on 15000 older persons in Delhi which revealed that most of the elderly experience loneliness in their lives due to little or lack of interaction with family members or within their immediate community. They most commonly feel marginalized and insecure due to lack of safety, health care and work opportunities, economic problems and restricted mobility. Psychologically too, they suffer utter desperation and seclusion. The study also reported that two-thirds of the older persons did not receive the respect and proper treatment they expected from their family members and society. The study, contrary to several other studies, noted that human right violation of older men was higher as compared to older women. (<http://www.thehindu.com/news/cities/Delhi/delhi-ignoring-its-elderly-reveals-study/article4090022.ece>)

It is apparent from the above, that the challenges and issues concerning elderly persons have recently emerged as an area of concern and interest for social scientists. Given this background of the changing relation between the elderly and their families and resultant challenges, it seems pertinent

to further understand the nature of problems associated with the elderly in another part of the Indian sub-continent in order to take concrete measures for security and welfare of the elderly people at large.

Therefore, the present study is aimed at understanding the nature of problems and challenges that the elderly people are facing and their plight as they themselves see it. In so doing, it is also attempted to analyze and understand the various coping mechanisms that the elderly use to deal with the challenges of ageing.

### AREA AND METHODS OF STUDY

This study was conducted in Aligarh city of Uttar Pradesh. Aligarh is a city known for its Lock industry and the Aligarh Muslim University, which is the oldest University in the city. Aligarh is the seat of higher learning, not only because of the Aligarh Muslim University but also because of the other institutions of higher learning such as colleges affiliated to Agra University and innumerable schools and colleges administered by the City and private educational institutions. The trend-set for education has spread so widely that private primary schools have mushroomed in almost all nooks and corners of the city. Such opportunities for education, and the subsequent lure for prospective job opportunities have brought about significant changes in the lives of people of Aligarh. This seems to have added fuel to the ongoing process of urbanization. The population of the city has also grown over the years and reached to 874408 in 2011 (Census of India, 2011). Aligarh is a city of multiple identities encompassing within it people from different religious, regional, linguistic and social class/caste categories. This diversified population lives in close proximity to each other. Added to this growing assorted population, the elderly population, has brought about new challenges which need to be identified and studied at the micro level.

Due to paucity of time and resources, it was not possible to select a large cohort. A convenience sample of 100 people above 60 years of age was selected through personal contacts. Although it is believed that a convenience sample does not represent the entire population, in this particular study, this was the only way in which participants could be found. Due to non-availability of a formal data bank on the elderly population in Aligarh, this appeared to be the most appropriate method that could be used as it is expected to provide some direction to the study, and, to enable collection of certain facts that are so far not available on the elderly population of Aligarh. Data for the study was collected through personal interviews using Interview guide and closed observation. The respondents were



encouraged to share their views and feelings freely so as to obtain qualitative information.

status, Educational status, Occupational status, Sources of income, Living arrangements, Decision Making and participation in family affairs, satisfaction with children, health, economic and psychological problems and finally the ways and means by which they deal with ageing.

## RESULTS AND DISCUSSION

The data collected for the study was classified in terms of attributes like Age and Sex, Marital

**Table 1: Age and Sex**

Age Group	Male	Female	Total
60-70	37(37%)	30 (30%)	67 (67%)
71-80	10 (10%)	13(13%)	23 (23%)
80+	04 (04%)	06 (06%)	10 (10%)
Total	51 (51%)	49 (49%)	100 (100%)

The table shows that a majority (67%) of, both male and female, respondents ranged between the ages of 60-70 years. The percentage of the elderly between the ages of 71-80 is smaller (23%).

It is noted that as the range of age moves upward, the proportion of respondents who are 80+ decreases as only 10% of the respondents are above 80 years of age. Though this is comparatively a much smaller percentage, yet, the age-wise distribution of data shows a trend towards increasing longevity. Like men, the proportion of women in higher age range declines but there are more women than men who are above 80 years of age. These findings are

congruent with the statistics released by The Ministry of Health and Family Welfare regarding rising life expectancy from 62.3% (men) and 63.9% (women) in 2001-2005 period, to 67.3% (men) to 69.6% (women) in the 2011-2015 period. The World Health Organization data (2018) shows 67.4 and 70.3 life expectancy for male and female respectively and points higher life expectancy of women than men. ([http://timesofindia.indiatimes.com/articleshow/29513964.cms?utm\\_source=contentofinterest&utm\\_medium=text&utm\\_campaign=cppst](http://timesofindia.indiatimes.com/articleshow/29513964.cms?utm_source=contentofinterest&utm_medium=text&utm_campaign=cppst), <https://www.worldlifeexpectancy.com/india-life-expectancy>)

**Table 2 : Marital Status**

Marital status	Male	Female	Total
Married	43 (43%)	29 (29%)	72 (72%)
Divorcee	02 (02%)	02 (02%)	04 (04%)
Widows /Widowers	06 (06%)	18 (18%)	24 (24%)
Total	51 (51%)	49 (49%)	100 (100%)

Table 2 shows that the percentage of married respondents was higher while the proportion of divorcees was found to be quite negligible. It is interesting to observe the fact that widows outnumber the widowers. This reiterates the figures given in the Census Reports that women have higher longevity than men. This difference, however, may also be attributed to certain cultural practices where age at marriage for husbands is generally higher than those of their wives. Moreover, the patriarchal values allow and encourage men to remarry, after the death of their wives, for the sake of nurturing the children. At the same time, society does not generally expect or allow women to remarry. More often than not, women are criticized and ostracized, if they remarry. Thus, women prefer to stay single who are then forced to live as dependents with their children or to be forsaken.

**Table 3 : Place of Birth**

Place of birth	Male	Female	Total
Urban	35 (35%)	27 (27%)	62 (62%)
Rural	16 (16%)	22 (22%)	38 (38%)
Total	51 (51%)	49 (49%)	100(100%)

The table shows that a small percentage of the respondents hailed from rural areas in

comparison to those who belonged to urban areas.

**Table 4: Educational Status**

Educational status	Male	Female	Total
Illiterate	03 (03%)	05 (05%)	08 (08%)
Primary	04 (04%)	08 (08%)	12 (12%)
Secondary	11(11%)	09(09%)	20 (20%)
Higher Secondary	13(13%)	10 (10%)	23 (23%)
Graduation	12(12%)	10 (10%)	22 (22%)
Post-Graduation or above	08 (08%)	07 (07%)	15 (15%)
Total	51 (51%)	49 (49%)	100 (100%)

Majority of the respondents had formal education. This may be due to the fact that, as residents of Aligarh, they had easier access to educational opportunities. Following the general trend, more men than women were educated. The

representation of elderly females at secondary and higher level is also comparatively low which could indicate the influence of socio-cultural milieu which, generally, is against providing educational opportunities to women.

**Table 5: Occupational Status**

Occupation	Male	Female	Total
Retired Government/Private sector employees	28 (28%)	12 (12%)	40 (40%)
Self-employed	16 (16%)	08 (08%)	24 (24%)
Unemployed	07 (07%)	29 (29%)	36 (36%)
Total	51 (51%)	49 (49%)	100 (100%)

Most of the elderly are former government employees or were employees in the private sector. Some of them were self-employed. Among retired and self-employed elderly, the number of males is higher than females. Most of the elderly women help

and assist young women in their families with household chores. A few male elderly assist their sons in running their business or get assisted by their sons in running their family business.

**Table 6: Sources of Income**

Sources of Income	Male	Female	Total
Pension	18 (18%)	24 (24%)	42 (42%)
Self-employment	16 (16%)	08 (08%)	24 (24%)
Interest from Bank	08 (08%)	02 (02%)	10 (10%)
Share from agricultural land	16 (16%)	04(04%)	20 (20%)
Rent from shops in villages	10 (10%)	02 (02%)	12 (12%)

Multiple responses

Majority of the respondents were reluctant to share information about their monthly income. Therefore, they were requested to provide information about their source of income. The information received through their multiple responses revealed that a large number of retired employees and widows depended on pension, which, apparently was

not their only source of income. Some received a share of their agricultural products or certain monetary benefits from their relatives taking care of agricultural activities in their ancestral villages. Others seemed to receive interest on their investments in Banks and/or rent payment of shops located at their ancestral place of residence.

**Table 7: Living Arrangements**

Living Arrangements	Male	Female	Total
Living with married sons	23 (23%)	29 (29%)	52 (52%)
Living with spouse	18 (18%)	14 (14%)	32 (32%)
Living with unmarried daughters	04 (04%)	02 (02%)	06 (06%)
Living alone	06 (06%)	04 (04%)	10 (10%)
Total	51 (51%)	49 (49%)	100 (100%)



The largest percentage (52%) of the elderly lived with their married sons, daughters -in -law and grandchildren. The second largest percentage (32%) of the elderly lived with their spouses. The percentage of those living with their unmarried daughters or living alone was quite low. Despite their pressing need of old-age-care, some of them were not welcomed in their sons' homes. However, it was interesting to note that this much needed care could be readily provided by their married daughters. These old parents, however, did not wish to live with their married daughters because of the taboo associated with the cultural values that after marriage daughters were no longer members of their paternal family but rather belonged to their husbands' family. As these elderly parents did not want to live with their daughters' husbands' families, therefore, they opted to live alone rather than with their married daughters' families, even though their daughters were willing to take them in.

A few of the elderly lived with their unmarried daughters, as they felt more comfortable and less embarrassed than living in the homes of their married daughters' families. It should be pointed out that the unmarried daughters were employed women of above forty years of age, whose life circumstances had forced them to remain unmarried. Their financial independence and lack of family responsibilities enabled them to take care of their elderly parents, whose patronage they enjoyed. The respondents admitted that they felt more comfortable and well-

adjusted living with their unmarried daughters, rather than with their married sons.

During the course of interview, some of the widows/widowers admitted that they lived alone because of incompatible relations with their sons' families. Some others admitted they had no choice but to live alone by themselves as their children were well settled abroad. In many cases, the parents did not want to disrupt or interfere with their children's lives.

By and large, the educated and retired elderly were in a better economic position as they could manage themselves financially as they had done before their retirement. Despite their sound economic situation, these elderly, seemed to suffer from mental stress. One elderly shared his feelings by stating *that his bank balance was of no use, as he could not enjoy the company, love and care of his children. He felt that his children did not want to give up their comfortable lives in foreign lands where they lived, even though they too missed their parents. He said he felt lonely and frustrated but had to suffer quietly.*

Another gentleman, in his late sixties, regretfully said that he felt as if he was only the "caretaker" of a big house that he had lovingly built for his family. *Since he had high aspirations for his children and encouraged them to seek higher education. After completing their studies, they were able to get jobs abroad and left the country to settle there. As a result, he was left alone in this big house to suffer loneliness and sickness. He felt that he was at the mercy and care of a maid servant.*

**Table 8: Participation in Decision Making regarding Family Matters**

Participation in Decision making	Male	Female	Total
Always	20 (20%)	11 (11%)	31 (31%)
Often	16 (16%)	13 (13%)	29 (29%)
Not willing to participate	07 (07%)	15 (15%)	22 (22%)
Not allowed to participate	04 (04%)	08 (08%)	12 (12%)
No response	04 (04%)	02 (02%)	06 (06%)
Total	51 (51%)	49 (49%)	100 (100%)

Decision making is an important aspect in the lives of the elderly because as people get older, they wish to continue to feel important and satisfy their ego. Sometimes, with age, the elderly may lose their ability to make decisions and sometimes younger family members may not consider the senior family members to be mentally fit to take decisions. Results of the present study show that majority of elderly always participated in important family decisions. Some (22%), however, were not willing to participate in family discussions, as some of them felt that their ability to think was greatly reduced. Some others did not want to interfere in their children's lives. On the

other hand, some of them (12%) wanted to be consulted in important family decisions, but their children did not seek their advice because they felt that their parents' views were either outdated and/or irrelevant.

It was observed that the number of males involved in the affairs of families is higher as compared to women who are traditionally considered incapable of taking important decisions. Discussions and interviews revealed that views of educated and employed women were given due respect by their family members. A close probe into the issue brought out the fact that views of those elderly, mostly males,



were given greater importance who contributed and supplemented family income, rather than being financially dependent on their children. Some of these elderly males still enjoyed the status of the head

of the family not only because of their knowledge and experience, but also because of their financial inputs to support their sons.

**Table 9: Level of Satisfaction with Children**

Level of Satisfaction	Male	Female	Total
Satisfied	20 (20%)	32 (32%)	52 (52%)
Partially satisfied	20 (20%)	10 (10%)	30 (30%)
Not satisfied	11 (11%)	07 (07%)	18 (18%)
Total	51 (51%)	49 (49%)	100 (100%)

The breakup in the table shows that quite a large number of elderly were satisfied with the behavior of their children. This was followed by a smaller percentage of those who were partially satisfied. However, a close interaction revealed that some of them did not enjoy cordial relationships with their sons' families but they were trying to hide the truth because they felt that it would hurt their family prestige. Elderly living with their unmarried daughters were quite satisfied with the care and support provided by them. Dissatisfaction with the behavior of their sons and their families was reported by 18% elderly. Compared to men, the prevalence of satisfaction among elderly women was higher. This was so perhaps because they expected less from their children. They seemed to find solace within their families rather than worry about interacting with family members. They showed more supportive attitude towards their family members and less concern about their own feelings.

It was observed that those elderly who have migrated from villages and were forced to live in urban areas appeared less satisfied and faced more adjustment problems with their family members than those who were born and brought up in urban areas. They seemed upset and hurt due to non-fulfillment of

their expectations and the treatment meted by their children. Some of them shared that in village life, they had treated their ageing parents with respect and provided necessary care. One respondent recalled:

*It was very difficult for us to have direct eye contact with our elders particularly fathers. We mostly communicated with them through our mothers. The decision of our parents was final and we all were bound to follow it. The young people of today cannot even think of the kind of respect and importance we had given to our parents.*

On the other hand, apparently, the elderly who did not care much about their elderly family members due to their busy city life, did not expect much from their young family members. Interestingly, few of them who, while enjoying their young lives ignored their old parents, expect care and support from their children. They regretfully explained:

*"Kabhi laga hi nahi, ke ek din hum bhi boodhe honge" (During our young age, we never realized that we will also become old at the end of the day. (meaning thereby that when people are young, they keep themselves busy in their own lives and do not care about their elderly parents...Little do they realize that one day, they too will be old and will need the help of their children)*

**Table 10 : Participation in Household Work**

Nature of Household work	Male	Female	Total
Kitchen related work	06 (06%)	16 (16%)	22 (22%)
Shopping and other outdoor activities	30 (30%)	08 (08%)	38 (38%)
Supervision of domestic helpers	12 (12%)	18 (18%)	30 (30%)
Care of grand children	26 (26%)	24 (24%)	50 (50%)

Multiple responses

Table 10 shows that an overwhelming majority of elderly helped their children by engaging themselves in different household chores and outdoor activities. The division of labor within the household followed traditional norms. While elderly women helped with household chores like kitchen work, care of grandchildren and supervision of maids who cooked and cleaned the house, the elderly men helped

with outdoor chores like shopping or taking care of grand children when they played outside the house. A few elderly men, particularly living with their unmarried daughters, did enjoy doing kitchen related work. Both male and female grandparents enjoyed taking care of their grandchildren except those who were in poor health. The elderly living alone had to either get all the housework done by themselves or with the help of domestic helpers.

**Table 11: Health Problems**

Disease	Male	Female	Total
Hypertension	18 (18%)	17 (17%)	35 (35%)
Diabetes	16 (16%)	14 (14%)	30 (30%)
Arthritis	16 (16%)	23 (23%)	39 (39%)
Respiratory problems	08 (08%)	06 (06%)	14 (14%)
Digestive system disorders	18 (18%)	16 (16%)	34 (34%)
Urinary problems	18 (18%)	15 (15%)	33 (33%)
Vision and hearing problems	08 (08%)	07 (07%)	15 (15%)

Multiple responses

One of the most nagging realities of ageing is that it is accompanied by health problems leading to physical and, sometimes, mental weakness. The present sample of the elderly exhibited physiological health problems such as, hypertension, diabetes, visual and hearing impairment, urinary and digestive disorders etc. There were no specific gender differences in aspects related to health. Some of the elderly showed signs of very poor health as they were suffering from multiple health problems. Comparatively, however, more female elderly than males suffered from joint pains. This may be due to

their being homebound and lack of outdoor activities and exercise. During the course of close interaction with the respondents, it was observed that a few respondents, regardless of gender, held an optimistic attitude about their health. These elderly wanted to be treated as though they were still young and active rather than being treated as useless old people. So, to achieve this goal and to avoid suffering from psychological setbacks, they tried to keep themselves busy and active by visiting friends or relatives and by helping their children in indoor and outdoor household activities.

**Table 12: Economic and Psychological Problems**

Problems	Male	Female	Total
Lack of regular income	07 (07%)	10 (10%)	17 (17%)
Financial dependence on children	12 (12%)	16 (16%)	28 (28%)
Lack of control over own income	05 (05%)	15 (15%)	20 (20%)
Inadequate money for healthcare	08 (08%)	12 (12%)	20 (20%)
Loneliness arising out of reduced social interaction	16 (16%)	17 (17%)	33 (33%)
Lack of emotional stability	06 (06%)	13 (13%)	19 (19%)
Feeling of worthlessness	13 (13%)	08 (08%)	(21%)
Feeling of incompetency	12 (12%)	07 (07%)	(19%)
Non-satisfaction with children's mechanistic life	16 (16%)	18 (18%)	(34%)

Multiple responses

On analyzing the economic problems of the elderly, the results show that one of the important problems of some of the elderly is lack of regular source of income particularly for those who are living alone. Financial dependence on their children was another major problem specially for elderly women. Some of the elderly depended on agricultural land as source of income. This income, however, was sporadic. So, some of the elderly men tried to find work but were not able to work due to their poor health, so they left themselves financially dependent on their children. Such financial dependence was perceived as a major economic as well as psychological problem especially for those who earlier exercised authority and enjoyed privileges due to their earning capacity. With the loss of their income they became financially dependent on their

children and began to feel the pressure of declining authority and respect within their families.

Some of the elderly women, on the other hand, did not experience much change in their lives as they have always been dependent on their families. However, some of them also considered financial dependence as an economic problem particularly those for whom the amount of pension is too less to fulfill their need. These elderly women were found in a more vulnerable position than men because not only did they lack a regular source of income, but a few of them were not allowed to control whatever income they received from various sources. Some of the uneducated widows who received pension as their source of income continued to be dependent on their sons who emotionally blackmailed them to control their income. Their hapless feminine emotions were exploited at a time when they needed their children's



support the most. The sons felt that since mothers were residing within their households, they should be compensated by contributing towards household expenses.

Another problem that the elderly faced was the financial crunch for health care. Some of them are unable to make use of government hospitals because of long queues and long waiting hours. They, thus, seek healthcare help at private hospitals which are too expensive and unaffordable. Their children, too, feel the burden of providing healthcare because of the high expenses and extra time devoted to their health care. As quite large number of these elderly are suffering from multiple health problems, spending on their health care is a major economic issue and stress for their families.

One of the respondents stated:

*“Our forefathers never complained of variety of diseases we are suffering from. Whatever minor health problems arose, they were cured mostly by Hakeems (traditional physicians) or by home remedies. They always led very healthy and active lives and demanded very little care from us. They were not supposed to take medicines as their diet, q as we do.”*

Loneliness and feeling of isolation are other problems which the elderly face. Though most elderly live with their spouses and children, and prefer such living arrangement because they want to enjoy the company and care of their family members. However, despite living with family, they feel isolated and lonely within their homes.

One of them shared :

*“We have been given a space to live in the house and that’s all! Our children interact with us just for fulfilling our needs of food or medicines.*

*Otherwise, they do not have time to intermingle and rarely interact with us. It is as though they do not want us to involve ourselves in their family affairs. So, we live like strangers with our own family members under one roof.”*

Apparent from the results is the fact that with ageing, certain psychological problems, such as feeling of incompetency and lack of emotional stability affect the lives of the elderly people. Being estranged from important family matters and from the decision-making roles, made them feel worthless. They complained that the younger generation no longer sought their advice. Basically, they were ignored because the young felt that, in this fast-changing world, the wisdom which once the elderly had has not kept pace with the changes that had taken place. If unsolicited advice was given, it was ignored by their children. Living day to day under such situations made them feel worthless and unwanted.

Some of the elderly were not satisfied, and, worried about “mechanistic” lives of their children. By mechanistic lives they meant their children’s preoccupation with work at the cost of relaxation and enjoyment. Elderly persons living with their unmarried daughters appeared more satisfied than others. They felt that their daughters not only spent sufficient time with them but also gave top priority to their health and emotional problems. It appeared that those elderly persons who had a positive outlook towards ageing and were always ready to lend helping hand for their family members, they commanded the respect of family members. On the other hand, those who were possessive and domineering did not enjoy the same recognition by their families.

**Table 13: Ageing and Coping Mechanisms**

Coping mechanisms	Male	Female	Total
Religious activities	22 (22%)	20 (20%)	42 (42%)
Watching Television	18 (18%)	12 (12%)	30 (30%)
Narrating stories and past experiences to children	17 (17%)	15 (15%)	32 (32%)
Meeting friends and relatives	12 (12%)	08 (08%)	20 (20%)
Reading newspapers and magazines	21 (21%)	10 (10%)	31 (31%)
Helping family members in household chores	13 (13%)	16 (16%)	29 (29%)

Multiple responses

Since loneliness appears to be an important issue in the lives of the elderly, it was important to examine what activities kept them occupied and active and helped them to cope and manage themselves. Interviews and discussions revealed that most of the elderly tried to cope with problems related to ageing by spending time in religious activities like offering prayers, attending religious gatherings and reading religious books. They found peace by participating in religious activities. With increasing age, they realized the importance of

religious activities not only for leading a peaceful and complacent life but also for preparing themselves for the life after death. They believed that with advancing age, they were moving towards their end and were apprehensive of their situation in the “hereafter” reward or punishment which would depend on their piety and submission to the will of the Almighty. Having spent most of their lives in materialistic and mundane activities, it was time to devote themselves to the sacred activities to appease and gain favor with the Almighty.



While, a number of the elderly spent time watching Television, they were more inclined to watch religious programs and tried to keep themselves abreast with news bulletins rather than “wasting “ time on movies or musical entertainment. A few elderly, however, enjoy watching musical programmes and movies on television. These elderlies believe that since *life is God’s precious gift, they must enjoy it to the fullest no matter how old they are. Since nobody can predict the future, it is best that life should be enjoyed to its fullest. No matter how old they are they may enjoy musical programmes on TV.*

Apart from occupying themselves with religious activities and spending time watching different programs on TV sets, the elderly enjoy sharing their past experiences of their lives with grandchildren. Recollecting their past seems to re-energize them and makes them feel enthusiastic about their present life. Most of the elderly want to spend time with family and friends but due to the busy schedules of the latter, they are denied this privilege. Some of them, like to spend time with their neighbors regularly but their children feel that such interactions are uncalled for, and, considered as disturbance and interference in private lives of the neighbors. Their children dissuade such frequent interaction by convincing the elderly parents that occasional meetings are the norms of urban social life, and they must try to adjust themselves in the community according to the code prescribed. Such restrictions are another cause for creating and continuing a lacuna in their already isolated life.

Most of the educated and economically self-sufficient elderly subscribe to various newspapers and magazines and occupy their time in reading. This practice is most common among males. Some of them who cannot afford this luxury, generally borrowed this reading material to engage themselves or to enhance their knowledge.

Other male members kept themselves engaged in household and outdoor activities for the benefit of their family members. Such involvement made them feel wanted and respected by their family members as productive members of their families. Among the various coping mechanisms, it was observed that those elderly persons who were well adjusted within their families were in a better position to cope with ageing, while coping mechanisms were less effective for those living with conflicting relationships. Likewise, psychological satisfaction was achieved when they viewed life optimistically and felt as though they were as fit and active as the young members of their families.

## CONCLUSION AND SUGGESTIONS

The present study focused on trying to understand the experiences of a sample of one hundred elderly persons living in Aligarh city. It was expected that by examining various situations and experiences that affect the lives of the elderly, one would understand the physical, psychological and economic problems of the elderly and other age-specific concerns such as their adjustment to newer life experiences which would help the community, social worker organizers and service providers to try to resolve problems of the elderly. Given the multidimensional nature of the problems of the elderly, there is an urgent need to understand and address the issues related to ageing.

The concern for the elderly is clearly visible in the form of various schemes and programs being implemented by the government particularly by The Ministry of Social Justice and Empowerment, Ministry of Finance and Ministry of Health and Family Welfare. However, the elderly need more social and economic security. This can be done by an increase in the amount of pension in the existing pension amount as the present pension is not sufficient particularly for those who live alone and are completely dependent on pension for their livelihood. Special schemes for those poor elderly who live alone are urgently needed.

Health is another issue that must be looked into by various government agencies and NGOs. The problems related to health-care of the elderly must be remedied through establishment of a Geriatric Care Facility in Government Hospitals, to ensure affordable and specialized health-care (both physiological and psychological) of elderly. Since the ailments of the elderly are quite different from those of the younger population, provision of subsidized ambulances, wheel chair facilities and comfortable waiting areas are necessary in addition to Multi-specialty clinics for geriatric care.

Quite significant number of the elderly in the studied sample suffer from lack of attention and care by their children. While the government cannot provide substitutes for this social malady, it can ease the pain of loneliness and neglect by providing special funds for trained domestic helpers to take care of such elderly people and by establishing Recreation centers like Elderly Clubs with library and games facilities.

Apart from this, there is a need to develop strategies at family and community level by which the talent and experience of the elderly population could be fruitfully utilized. To this end, provisions should be made for formal counselling and training for the elderly to get them prepared for active and positive roles. Their involvement in self-fulfilling and



socially useful activities may prove helpful in coping with different problems arising out of ageing.

The role of the families is of prime importance not only in providing proper care and support to the elderly people but also in the transmission of values promoting respect and care of the elderly. Such values must also be transmitted to the younger generation through schools as well as media. Through the School System and media, the government must promote awareness of the existence and problems of the elderly people in order to ensure them dignified place in society.

Though this study has certain limitations, the study reveals some of the pressing problems and issues affecting the very being of the elderly persons. In view of the growing elderly population, it is suggested that more such studies be conducted with a larger sample to further understand and provide insights into other issues that the elderly are facing in India.

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## DEVELOPMENT AND EVALUATION OF POLYHERBAL POWDER FORMULATION AS IMMUNITY POWER BOOSTER

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### ABSTRACT

*In the present study, poly-herbal Immunity powder drink was developed by using some traditional herbs having proved nutritional potential. The key ingredients were selected as cinnamon bark, Asafetida, Black pepper powder, lemon juice based on their household routine use in the summer with proven refreshing, cooling and improve immunity, energetic feeling since ages. After several trials made, the final composition of formulation was selected as most suitable combination based on the taste and physicochemical properties. The physicochemical analysis of the prepared drink found to contain optimum level of pH which was in accordance of the commercial recommendations. During the nine point's hedonic scale sensory evaluation, the drink was strongly liked for colour, taste, flavor and texture. The developed herbal drink provides an economical and feasible option for the consumers with very good taste combined with potential health benefits. The present drink is potentially capable to replace the synthetic drinks available in the market.*

**KEYWORDS:** *poly-herbal powder drink, sensory evaluation, herbal drugs.*



## 1. INTRODUCTION

India has used the herbal drugs long safe and continuous uses in alternative medicines for the treatment. Millions of people from the world wide used herbal medicine continuously and number of will be double in few years. Indian are used herbal drugs regularly as home remedies, health food as well as over the counter as self-medications by Ayurveda doctors. Its definition was “any substance that may be considered food or part of a food and provides medical or health benefits, including the prevention and treatment of disease. Such products may range from isolated nutrients, dietary, supplements and diets to genetically engineered ‘designer’ foods, herbal products, and processed foods such as cereals, soups, and beverages. Herbal drugs medicine has emerged as popular complementary and alternative medicines OR Supplementary to modern medicines. The preparation contains poly herbs such as cinnamon bark, Asafetida; Black pepper, powder and lemon juice has proved pharmacological activity with no of side effects. The cinnamon bark is used as carminative, stomachic and mild astringent. It has been used as an expectorants and demulcents and also used as antispasmodic activity. Asafetida is used as carminative, anti-viral, antibacterial, anti-inflammatory, sedative and diuretic properties. Black pepper the king of spices. Loaded with Antioxidants, Enhances Digestion, Helps You Sweat Support, weight loss efforts , Helps Get Rid of Gas, Vitiligo, Colds, Infection, Supports, Speeds Up Absorption of Drugs Supports Brain Function Acts as an Anti-Depressant, Anti-inflammatory, Helps You Quit Smoking, Lemon juice will always help in the well-being of our body in some or the other way. Lemon is an excellent source of Vitamin C; hence it helps boost your immunity, metabolism and prevents viral and bacterial infections, including cold and cough.

It is known to be associated with a range of polyphenones& citric acid. The herbal formulation contains such as cinnamon bark, Asafetida, Black pepper powder, and lemon juice which has shown pharmacological activity with no side effects. The preliminary phyto-analysis test such as Ash value, Loss of Drying, sensory evaluation etc. test were carried out. The Herbal Immunity booster is best choice for the replacement of Soft Energy drink usage and tackles the adverse effects.

## 2. MATERIAL AND METHODS

### 2.1 Selection and Collection of Herbs

The cinnamon bark, Asafetida, Black pepper, lemon from the local market at Vijayawada, but the care was taken that material should be fresh and hygienic. After the collection of Cinnamon, asafetida & black pepper, it was dried in shade for 24 hrs and all ingredients powder with the help of mixerjor were reduce in small size and pass through the sieve No.40.

### Methods -Preparation of powder formulation

Cinnamon bark, Asafetida, and Black pepper were clean and the sliced in small pieces dried for one day in sunlight, and then powdered separately in grinder& Passes through sieve no. 40. All the powder drugs as per formula mixed together in mortar pastel. After mixing powder dried in hot air oven at 40°C for 1 hr. and then they were packed in air tight container. The six different types of the formulation were prepared out of them two (HIB 1 and HIB 2) were finalized for the further study. The addition of constitute is depends on their pharmacological activity which was already proved for the use.

**Fig .1.Cinnamon, Asafetida, Black pepper powder**

### Quality Evaluation

Quality evaluation of prepared Herbal Immunity booster was essential for the efficacy, safety determination. Both physicochemical and phytochemicals evaluation was carried out by comparing it with the standard parameters. Sensory evaluation was also performed in terms of sight, smell, taste, touch and hearing.

### Sensory Evaluation

Consumer awareness concerning formulation has increased the number of positive attributes desired for these products, apart from refreshment. However, no matter how nutritious the preparation, the taste must be acceptable or it will not be consumed. Sensory analysis was performed by using nine points hedonic rating scale by a panel of five people. The parameters for evaluation includes appearance, colour, taste, flavor, consistency and overall acceptability of Herbal immunity booster powder drink.

### Physicochemical and Phyto chemical

**Evaluation** Various physicochemical parameters like pH, total soluble solids, and total sugars were performed. Moreover, the prepared powder drink was analyzed for the presence of carbohydrates, proteins, glycosides, tannins, polyphene and flavonoids using standard procedures.

**1. Determination of Moisture content:** The moisture content was measured described by AACC method. Two gram sample was placed in a preheated and weighed glass petriplate and then dried in a hot air oven at 130 °C for 2 hrs. Or till constt. Weight after drying glass petriplate was transferred to the dessicator to cool and then petriplate was reweighed. The loss in weight was calculated as percentage of moisture content.

$$\text{Moisture content (\%)} = \frac{W1 - W2}{\text{Weight of Sample}} \times 100$$

W1 = Weight (g) of Sample before drying.

W2 = Weight (g) of Sample after drying.

**2. Determination of Ash content:** The ash content was measured, described by AACC method. Two gram sample was placed in a Pre weighed crucible and then uncovered crucible was allowed to incinerate in a muffle furnace at 820°C for 4 hours and then crucible was cooled in a dessicator and then weighed.

$$\text{Ash (\%)} = \frac{\text{Weight of ash}}{\text{Weight of Sample}} \times 100$$

### 3. Phytochemicals Analysis

**3.1. Determination of Total Phenolics** Total phenolics were determined using the Folin –Ciocalteu assay. The absorbance was measured at 765 nm and the results were expressed in gallic acid equivalents.

**3.2. Determination of Total Flavonoids** Total flavonoids were estimated using Aluminium Chloride colorimetric method. The Absorbance was measured at



510 nm. Results were expressed in Catechin equivalents.

% of Flavonoids =  $\frac{\text{Final Weight} - \text{Initial weight}}{\text{Weight of Sample}} \times 100$

### 3.3. Determination of Tannins

Tannins were estimated according to the method described by Van- Buren and Robinson Absorbance was measured at 605nm and the result was stated in Tannic Acid equivalents.

### 3. 4 Evaluation of Formulated Herbal Immunity Booster <sup>(25-28)</sup>

In development of new dosage form preformulation study is the prior step in the possible drug development. It is the principal investigation in the drug development to obtained information on the known properties of compound and the proposed development schedule. So, this preformulation study may merely confirm that there are no significant barriers to compound development. Following pre-compressional parameters were studied like angle of repose, bulk density, tapped density, compressibility indices etc.

#### Angle of Repose

The fixed funnel method was employed to measure the angle of repose. A funnel was secured with its tip at a given height (h), above a graph paper that is placed on a flat horizontal surface. The blend was carefully pored through the funnel until the apex of the conical pile just touches the tip of the funnel. The radius of the base of the conical pile was measured. The angle of repose ( $\theta$ ) was calculated using the following formula:

$$\tan \theta = h/r$$

Where,  $\theta$  = Angle of repose,

h = Height of the cone,

r = Radius of the cone base.

Values for angle of repose  $\leq 30^\circ$  usually indicate a free flowing material and angles  $\geq 40^\circ$  suggest a poorly flowing material, 25- 30 show excellent flow properties, 31-35 show good flow properties, 36-40 show fair flow properties and 41-45 showing passable flow properties

#### Bulk Density

15 g powder blend introduced into a dry 100 ml cylinder, without compacting. The powder was carefully leveled without compacting and the unsettled apparent volume,  $V_o$ , was read. The bulk density was calculated using the following formula.

$$\rho_b = M / V_o$$

Where,  $\rho_b$  = Apparent bulk density, M = Weight of sample, V = Apparent volume of powder.

#### Tapped Density

After carrying out the procedure as given in the measurement of bulk density the cylinder containing the sample was tapped 500 times initially followed by an additional taps of 750 times until difference between succeeding measurement is less than 2% and then tapped volume,  $V_f$  was measured, to the nearest graduated unit. The tapped density was calculated, in gm per ml, using the following formula.

$$\rho_{tap} = M / V_f$$

Where,  $\rho_{tap}$  = Tapped density, M = Weight of sample,  $V_f$  = Tapped volume of powder.

#### Carr's index The Compressibility index

(Carr's index) is a measure of the propensity of a powder to be compressed. It is determined from the bulk and tapped densities. In theory, the less compressible a material the more flow able it is. As such, it is measures of the relative importance of inter particulate interactions. In a free flowing powder, such interactions are generally less significant, and the bulk and tapped densities will be closer in value. For poorer flowing materials, there are frequently greater inter-particle interactions, and a greater difference between the bulk and tapped densities will be observed. These differences are reflected in the Carr's Index which is calculated using the following formulas:

$$\text{Compressibility index} = \left[ \frac{(\rho_{tap} - \rho_b)}{\rho_{tap}} \right] \times 100$$

Where,  $\rho_b$  = Bulk Density,  $\rho_{tap}$  = Tapped Density.

**Table 1: Compressibility index values Carr's Index**

Compressibility	Index Properties
$\leq 10$	Excellent
11 - 15	Good
16 - 20	Fair
21 - 25	Passable
26 - 31	Poor
32 - 37	Very Poor
$> 38$	very Very Poor

**Hausner's Ratio**

Hausner's ratio is an indirect index of ease of powder flow. It is calculated by the following formula.

Hausner's Ratio = Tapped density (PT) / Bulk density (PB) Where, PT tapped density and PB is bulk density. Lower Hausner's ratio (<1.25) indicates better flow properties than higher ones, between 1.25 to 1.5 showing moderate flow properties and more than 1.5 poor flow.

**3. RESULT AND DISCUSSION****Preparation of powder formulation**

Preparation of powder dried mixed. The Herbal Energy powder drink as mentioned resulted in varying yields as detailed in Table:

**Table 2: Preparation of powder formulation**

S. No	Content	Quantity
1.	Cinnamon	75%W/V
2.	Asafetida	15%W/V
3.	Black pepper	2.5% W/V
4.	Lemmon Juice	0.02%W/V
5.	Sugar	10%W/V
6.	Salt	0.001%W/V
7.	Water	100 ml

**Sensory Evaluation**

Sensory evaluation parameters observed in Herbal Energy booster powder drink. The observed parameters like color, taste, flavor, texture, overall acceptability at room temperature of the formulation

is presented in Table2. On the basis of paired comparison evaluation the drink has very good taste, flavor and overall acceptability. Change in sensory characters during storage was also analyses.

**Table 3: Sensory Scores of Herbal Immunity Booster**

Parameters	Formulation (sugar)
Color	8
Taste	8
Flavor	7
Texture	7.5
Overall acceptability	8

1= extremely dislike, 2= strongly dislike, 3= moderate dislike,  
4= slight dislike, 5= neutral, 6= slight like, 7= moderate like, 8= strongly like, 9= extremely like

**Physicochemical and Phytochemicals Analysis**

In order to evaluate the suitability of formulation for

nutritional purpose physicochemical and phytochemicals parameters were carried out.

**Table 4: Phytochemicals screening of herbal drugs**

S. No	Phytoconstituents	Test	Result
i.	Carbohydrate	Benedicts test	+ve
ii.	Protein	Biuret test	-ve
iii.	Alkaloid	Dragondroffs test and Wagner's	+ve
iv.	Flavonoids	Shinoda test	+ve
v.	Tannins and Phenolic content	Lead acetate & acetic acid	+ve
vi.	Saponins	Foam test	+ve
vii.	Fat	Filter paper test	-ve

The active principles in phyto pharmaceuticals are not always known. Preliminary phytochemicals analysis of herbal Immunity powder drink showed the presence of alkaloids, carbohydrates, proteins, tannins, flavonoids and phenolics

**Phytochemicals analysis**

Phenolics and Flavonoids are a wide class of chemical compounds found in plants. They report quality and nutritional value and plays a vital role in human fitness such as anti-inflammatory, antidiabetic, antiviral, antioxidant, Therefore, total phenolics and flavonoids content of different herbal Immunity& energy booster formulation of were estimated Table 4

**Table 5: Phytochemicals analysis**

Formulation	GA Equivalent (µgGAE/mg sample)	Catechin equivalents (µg CE/mg)	Tannic acid Equivalents (µg TAE/mg)
HIB1	18.43	49.2	0.292
HIB2	11.7	28.2	0.2951
HIB3	18.3	26.8	0.2696
HIB4	15.2	22.4	0.2598

Crude tannin is the compounds present in plants. Tannins are poly phenols that are responsible for the astringent flavor of food and show anti-carcinogenic

nutritional analysis are very important because it directly affects the nutritional content of the food, its stability and storage, etc. The moisture and ash contents were calculated for Herbal Energy booster powder drink. The pH of freshly prepared Herbal Immunity booster drink was 5.5.

**Phyto Pharmaceutical Test**

Moisture content and ash analysis during

**Table 6: Phyto Pharmaceutical Test**

S. No	Ash Content	Moisture content	Ph
HIB1	4.7%	3.5%	4.5
HIB2	4.5%	4.7%	5.2
HIB3	5.1%	4.5%	5.4
HIB4	5.1%	5.6%	5.5



**Table 7: Physical Evaluation of herbal energy booster**

S. no	Parameters	Results
1.	Angle of repose	30.6
2.	Bulk density	0.53
3.	Tap density	0.69
4.	Carr's index	23.5
5.	Hausner's ratio	1.23

Angle of repose was 30.6, here bulk density 0.53, tap density 0.69, Carr's index is 23.5 and Hausner's ratio was found 1.23 which shows its moderate flow property. All results are showed in table

### CONCLUSION

The formulation beneficial for the diabetic as well as non- diabetic persons. The formulation is prepared from the plants source so the chances of side effects are lower than the soft drinks. This is good supplement for freshly recover from the illness and give the freshness to the person. This health immunity boosting powder drink is a natural option to the synthetic drinks along with several health benefits. All the herbs used in this preparation are easily available during any season and are not costly thus the product is economically feasible.

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Experimental design, guidance for the Research work and writing of this manuscript was done by Ch. Surya Kumari. Second author SK.Asha Begham supported to draft manuscript design and correction of data. Third author performed the experiments, analysed spectra and interpreted the result. All authors played an equal role in completing this research work.

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The authors report no conflicts of interest. The authors alone are responsible for the content and writing of this article.

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# THE CONDITION AND RESEARCH OF HISTORICAL AND CULTURAL MONUMENTS ON THE EVE OF THE SECOND WORLD WAR AND IN THE YEARS OF THE WAR

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## ABSTRACT

*The article analyzes the state and preservation of historical and cultural monuments before and during the Second World War, the direct initiative and leadership of organization Uzkomstaris which is responsible for the protection of historical and cultural monuments in Uzbekistan, using archival materials and scientific literature.*

**KEY WORDS:** *Uzbekistan, historical and cultural monuments, protection, ancient city, Uzkomstaris, madrasah, mosque, museum, Ferghana valley.*

## INTRODUCTION

On the eve of World War II, the study of historical and cultural monuments in Uzbekistan was primarily focused on the registration and protection of historical and cultural monuments in the country. These efforts were made at the direct initiative and under the leadership of Uzkomstaris which at that time was responsible for the protection of historical and cultural monuments in the republic. The special work plan of the Uzkomstaris Committee for 1938-1942 focused on an important issue - a comprehensive study of the past of the peoples of Central Asia. On the other hand, his important attention was focused on the protection of ancient architectural monuments, as well as other categories of historical monuments (ancient cities, tombs)[1, p.4].

## METHODS

According to this plan, on March 19, 1939, according to the decision of the Organizing Committee of the Central Executive Committee of the USSR №-340, the gates of Bukhara Karshi, Imam, Samarkand, Salokhona, Shergiron, Mazar and the adjacent city wall were removed from state

protection and handed over to the city council. Also, Taqi Sarrafon, Kokaldosh madrasah were taken from the state protection and the Ark building was included in the category of museum of republican significance as Bukhara museum. During these years, as in other regions of the country, attention was paid to the scientific study of architectural structures in the Ferghana Valley. For example, during 1938-1939, the architectural monuments of the Ferghana Valley were studied in detail by the architect V.L.Voronina and ethnographer A.K. Pisarchik.

## RESULTS AND DISCUSSIONS

At the same time, this issue has a special place in the research of a group of well-known archeologists I.Ahrorov, N.G.Gorbunova, Yu.A.Zadneprovsky. During this period, more than a hundred monuments of Fergana architecture of the XVI-XIX centuries, located in different district of the valley, were registered. One such monument in the valley is the Khudoyorkhan Palace in Orda, which was built in the second half of the 19th century on a hill in Kokand. The palace occupied a rectangular area of about four hectares and formed a multi-courtyard composition [2, p.4]. The palace consisted



of about 100 rooms, the first half of which was a courtyard with a porch on the outside, in which there was a magnificent hall for reception, a mosque with a separate stage. This cultural monument is one of the most important objects in the Fergana Valley, which has attracted many tourists. Archaeological excavations were carried out in the territory of Chirchik-Angren, Samarkand and Zarafshan valleys of the ancient Sogd region [3, p.5].

In 1939, the old Ishratkhona (second half of the XV century) was analyzed by scientists under the leadership of G.A. Pugachenkova. This historical building, which has a unique art of construction and architectural style, was thoroughly analyzed, and on the basis of the materials collected on it, the museums were enriched with source information. Significant work was done in 1938-1940 on the collection of exhibits in the Museum of History. In particular, a database on industrial enterprises such as the Tashkent Textile Combine, Andizhan Oil Refinery and Ferghana Cotton Ginning Plant has been created. Active researchers of the museum Yu.Burigina and B.S.Sergeev collected materials on land and water reform in Ferghana and the national-territorial state delimitation. During the construction of the Huge Ferghana Canal, valuable materials on ethnology and folklore, newspapers dedicated to the excavation of the canal, memoirs, various posters and material items were collected, which in turn were used to promote propaganda work on the construction of irrigation facilities. In addition, archeological materials found during the construction of the Greater Fergana Canal have a special place in the museum collections [4, p.47]. Many exhibits of the Museum of National Economy, which was closed in 1938, were also transferred to the Museum of the History of the Peoples of Uzbekistan. Apparently, there have been cases of mergers in many museums due to economic problems. During the years under study, many historical mausoleums were destroyed as a result of neglect, and some of them were demolished by order of Soviet officials. One of such constructions was the mausoleum of Bobokhoja, a descendant of Qaffol Shoshi, built in the late 16<sup>th</sup> century in the "double" style [5, p.270]. The mausoleum was demolished in 1939. According to historical evidence, in the middle of the XIX century in front of the Barakkhan madrasah was built the Tashkent mosque ("Tillashaikh mosque"), Muiy Muborak madrasah, mosque (not preserved). At the beginning of the 20<sup>th</sup> century, the Tillashaikh Mosque was rebuilt and Eshan Babakhan was buried there.

On the eve of the war, the repair and restoration of historical and cultural monuments was not carried out satisfactorily. There was a serious situation in the industry: the state planning committee of the center refused to provide the necessary

materials for the repair of buildings - wood, iron and nails [7, p.18] and the work of technical staff was unsatisfactory. As a result, the strengthening and repair and reconstruction of the Jarkurgan tower, which dates back to the XVIII century, was left halfway. The indifference of the Soviet authorities to the preservation of cultural monuments, the failure to complete this work, further accelerated the process of collapse and destruction of the historic tower. It should be noted that even in the difficult conditions of the war, some changes were made in the activities of museums of the republic, including the State Museum of History and Art of the Peoples of Uzbekistan V.V. Struve, M.S. Andreev, A.Yu. Yakubovsky, Well-known scientists such as P. Tolstov, A.Semyonov, K. V. Trever, T.Mirgiyosov acted as members of the Scientific Council [8, p.188]. These scientists, in turn, made an important contribution to the study of existing material and cultural monuments in the republic and their scientific study. There have also been positive changes in the expansion of museums, which play an important role in the preservation of monuments, the formation, reconstruction and use of museum funds for propaganda purposes. In the early 1940s, a number of research works and special researches carried out by the staff of the Uzkomstaris Committee were published in scientific articles, bulletins, periodicals. Most of the publications are based on the results of archeological expeditions in the country, and significant results have been achieved in the historiography of the history of Uzbekistan. In particular, archeological expeditions conducted by archeologists in Khorezm, Bukhara, Varakhsha, Ayritom and other regions have provided new information about the cisterns, found an ancient Stone Age man in the Teshiktash cave and identified a number of ancient finds. The development of local archeologists Ya.G. Gulomov, M.Yu. Saidjanov and T. Mirgiyosov was of great importance in the science of Uzbek archeology and its development [9, p.10].

These scientists made an important contribution to the development of the science of archeology and the recognition of archeological monuments in the world. In June 1940, the Uzbek Committee for the Protection of Ancient, Revolutionary and Art Monuments developed the "Guidelines for the Identification, Record and Protection of Ancient, Revolutionary and Art Monuments" [10, p.1] and approved by the Council of People's Commissars of the USSR. According to this instruction, Uzkomstaris is responsible for the registration, identification and protection of state and local monuments. According to the instructions, Uzkomstaris strictly prohibits the transfer, sale and donation of all types of state-registered monuments. All types of monuments under state protection,



approved by the Uzbek SSR, were transformed into real estate and nationalized property of the Uzkomstaris Committee. Separately, the repair, restoration and protection of local monuments will be carried out from the budget of local organizations. Uzkomstaris is tasked with recording all types of research work, scientific trips and expeditions. According to the mentioned document, the types of state-registered monuments included [11, p.4], historical-revolutionary monuments; archeological monuments; architectural monuments; monuments of fine arts and sculptures; memorial monuments.

On the eve of the war and in the war years, there is a scientific study of the monuments and mosques - mausoleums, which reflect the traditions and ancient rituals of the Uzbek people. In particular, in October 1940, during a scientific trip to Nurata led by ethnologist A.K. Pisarchik, a number of information about the ancient monument in the city of Karmana was collected. This cultural-architectural mausoleum (10<sup>th</sup> century) was named Mirsaid Bahrom and was registered by an ethnologist [12, p.19]. Due to the difficult economic conditions during World War II, many museums in the republic were not financially self-sufficient. This, in turn, has led to a reduction in the activities of museums and the generalization of some of them. During this period, the polytechnic exhibition was closed and the Art Museum was suspended, and in November 1941 it was added to the Museum of History of the USSR together with the Navoi Museum. As a result, the combined museums were tasked to fully identify local resources and study them in detail from a scientific and practical point of view. The Museum of History and Art donated its halls to industrial enterprises and in late 1941 moved to the former Polytechnic Museum building. In addition, during the war years, the issue of architectural monuments of Central Asia, in particular Uzbekistan, and their history, condition, specific oriental methods of construction of madrasas and mosques were included in the scientific analysis as a separate study. In particular, the researches of ethnographers, archeologists, art historians such as L.Voronin, B.Zasipkin, L.Rempel, B.Baklanov, V.Voronina, G.Gaganov, Central Asian architecture, history and culture of cities, ethnographic monuments and ancient monuments.

Many scientific works on the history of as noted above, even in the difficult economic situation during the war years, valuable archeological excavations were carried out in the republic. Archaeologists have carried out excavations at the Mirzo Ulugbek Observatory, as well as in its suburban gardens, Afrosiyab and Varakhsha. Archeological and ethnographic expeditions were revived in Khorezm under the leadership of well-

known archeologists Ya.G. Gulomov and S.P. Tolstov, rare archeological monuments of ancient Khorezm civilization were opened and involved in scientific research [13, p.490]. The mistakes of the Soviet economic and cultural organizations in the protection of monuments required the necessary measures to preserve the existing art, historical and cultural sites in the republic.

In particular, on December 29, 1940, the Bukhara Regional Executive Committee adopted a resolution "On measures to protect ancient, revolutionary and art monuments in Bukhara region and the city" [14, p.35]. According to him, the tasks were set to implement measures to protect the ancient and Muslim architectural monuments in Bukhara. However, the work to be done here in the field of archeology was not carried out in a planned manner. In particular, the excavations that were to be carried out to inspect the foundation of the Minorai Kalon were left unfinished due to lack of capital funds. Of the planned and important works, only the excavations in the north-western part of the Mir Arab madrasah and under the roof of the Magoki Attori mosque were carried out. Important practical work has been done on the comprehensive study and protection of the existing revolutionary monuments in the country. For example, on January 1, 1941, the Committee of Uzkomstaris took into account 58 monuments in the revolutionary sector and began a comprehensive study of them. They were mainly associated with the uprisings of 1905-1916, the October coup, the civil war. In short, the main activity of the sector was the study of the "history" of the uprisings that took place under colonial conditions and organized revolutionary movements.

The regional branches of the Committee have also taken important measures in the field of repair and restoration of historical monuments. At the initiative of the branches, 25 monuments were repaired at a cost of 246,835 rubles. Carrying out repair work on the monuments under state protection, in turn, served to restore the appearance of the complexes to their original state. Although it was officially noted that all historical, artistic and revolutionary monuments of historical and artistic value in the republic were protected by the Uzkomstaris Committee, in early 1941 the organization included about 90 architectural, revolutionary and artistic monuments [15, p.58]. At the same time, Uzkomstaris was tasked with repairing a number of architectural and cultural monuments. On this basis, a capital of 20,000 rubles was allocated for the financing of a special exhibition dedicated to May 1, 1941 in the republic. The Samarkand branch of the Committee was allocated 425,000 rubles for the repair of a number of architectural monuments of the Timurid period,



including the Gori Amir, Ishratkhana, Shahizinda mausoleums, Ulugbek Observatory and Madrasah, Bibikhanum Mosque and Mausoleum and Barakkhan Madrasah [16, p.1].

Measures to protect historical and cultural monuments in the southern region of the country, in particular in Surkhandarya, are explained by a special resolution of the Executive Committee of the Surkhandarya District Council of Workers' Deputies on January 18, 1941 "On the state of cultural monuments in Surkhandarya district" [17, p.9]. According to him, the Kokildora and Kyrgyz monuments in Termez district, the Jarqurghon tower and the madrasah in Denau district were transferred to Termezkomstaris. The text of the resolution also highlights the measures taken to protect historical and cultural monuments in the region, their full registration, preservation, the organization of ethnological and archeological expeditions, as well as shortcomings in this area. The activities of the Uzkomstaris Committee include the organization of anniversaries of great thinkers of the Uzbek people and their holding throughout the country. By holding such practical events, the birthdays of Uzbek thinkers were celebrated, and the committee took the initiative and was responsible for holding these responsible events.

In this context, on April 23, 1941, the Central Committee of the Communist Party of Uzbekistan and the Council of Ministers of the USSR adopted a resolution "On measures to celebrate the 500<sup>th</sup> anniversary of Alisher Navoi". One of such important tasks related to the celebration of this anniversary, as noted above, was entrusted to the Committee Uzkomstaris. In particular, the Uzkomstaris committee was instructed to prepare for publication the collection "Architectural image of Samarkand in the time of Alisher Navoi" and its publication in 5,000 copies from the beginning of the anniversary. Thus, a special commission was set up to make an important contribution to the scientific circulation of previously non-existent cases in anthropology and epigraphy. During the war years, the organization and organization of museum work in the republic was one of the urgent tasks. Even in difficult conditions, the organization of mobile and stationary exhibitions by the staff of the Museum of the History of the Peoples of Uzbekistan has gradually become popular. One of such mobile exhibitions was organized in 1942 under the name "Courage of our Motherland". The exhibition reflected the courage of Uzbeks in World War II.

The museum staff also organized talks and lectures on the courage of the Uzbek people behind the front, the international situation in industrial enterprises and educational institutions. Accordingly, special attention was paid to the expansion of public

education and advocacy in the activities of museums. In particular, the organization of exhibitions in the Museum of History has become more active: the exhibition "Folk Art of Uzbekistan", founded in 1943, has become notable. The exhibition focuses on the centuries-old examples of applied arts of the Uzbek people, folklore, art and works of art [18, p.46].

In 1943, the Uzbek Committee for the Protection of Ancient, Revolutionary and Art Monuments under the Uzbek Soviet Socialist Republic became the only cultural organization in the country, which also carried out a number of practical work on the protection of ancient and art monuments. In particular, this year Uzkomstaris managed to restore and repair the mausoleum of Amir Temur, an architectural monument of Uzbekistan in the XIV century. In October and November of this year, 18 key staff members of the Uzkomstaris Committee were sent here for repairs, and an additional 7 people were sent on a contract basis [19, p.4]. In the same year, research institutions covering various fields of science were established in the country. In particular, in 1943 there were 19 research institutes, 23 different scientific stations, 3 observatories, 11 museums and 6 different research institutions in the territory of the republic. The establishment of research institutions has opened a wide way for a comprehensive study of historical and cultural monuments of the republic, their protection. The establishment of the Academy of Sciences as a coordinating center for research in the country has served as a basis for significant changes in the activities of museums.

After the decision of the Council of People's Commissars of the Union on September 27, 1943 "On the establishment of the Academy of Sciences of the Uzbek SSR", the Museum of History, along with other institutions, was separated from the Museum of Art as a central museum for research and political education was included in the Academy of Sciences of the USSR under the name of the museum [20, p.9]. In addition, the Museum of Nature was included in the structure of the Higher School of Sciences. In turn, a number of new opportunities have been created in the activities of museums of the republic in the organization of research work, as well as significant changes in the protection of cultural monuments.

## CONCLUSION

In conclusion, during the years of World War II and on its eve, there were some changes in the system of protection of historical and cultural monuments in Uzbekistan. The hardships of the war also had a negative impact on the system of preservation of cultural monuments: the number of museums was reduced and most of them were



merged. In turn, the scope of activities of the Uzkomstaris Committee has become more active than in the past. The monuments which embody the historically specific type of archeological, art and revolution of all historical and artistic value in the republic were transferred to the disposal of the committee and protected.

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# WHAT SHOULD BE KEPT IN MIND WHILE TEACHING VISUALLY IMPAIRED STUDENTS

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## ABSTRACT

*This article discusses the issue of the teaching language for the learners with visual impairment: the problems and challenges that they face in particular. The main focus is given to the analysis of the researches done on the field and based on their analysis some suggestions and tips are provided for the teachers.*

**KEY WORDS:** *Visually impaired, degrees of vision, low vision, limited vision, sighted, braille code.*

## INTRODUCTION

In modern methodology all category of learners are approached in teaching foreign languages. The category of learners that we want to discuss in this article are visually impaired. As it is known this type of learners have difficulty in vision and so that materials based on visualization is not the solution for them. Mainly they are approached by listening, still this way could not be always used as language is required written communication as well. So, what any teacher should keep in mind while teaching the language for such learners. Further in the article we will try to list out these parameters.

## OBJECTIVES

Visually impaired learner perceps world in another way and so with education. Visually impaired leaners refer to the category of loss of vision. As such students' impairment significantly differ, individual teaching conditions should be created: even if they can use eyeglasses or corrective lenses, they need individual approach to learn the language. However, it does not mean that they are too limited in learning the language. Researches done on the field stated that blind learners cannot percept things as sighted ones and due to this; they cannot develop some of the concepts. It is hard to get concept of perspective for the learners who are blind from childhood (Vanlierde et al.2005). However, according to Rosel et al (2005) in both cases, children create conversation within a small group. Additionally, Atkinson (2004) calls such situation as "small culture".

## LITERATURE REVIEW

It stated that visually impaired learner percepts the language via verbalism, which has been a controversial in the learning environment of a blind children recommending ideas to avoid visually imaginary materials while teaching. The use of BAD and BED is a common case to all language learners, for example; the real question is the way to approach in teaching of its difference to both category of learners. Especially in our case to make clarification of the use of any new linguistic uses or concepts is challenging. Scholars specified the nature of blind students by exemplifying everyday language word they use. Accordingly it is pointed out that visually impaired people often use words such as "I have seen", "show me" that defines visual concepts, even they may face difficulties in defining them and their structures. So that researchers concluded that children with visually impairment and sighted have no much difference in acquiring the language (McGaha G, Farran DC, 2001). The only difference is in the social behavior of both categories. For example, sighted children play differently; they spend much time near other children and actively participate in interaction, while blind ones do them less, spending more time alone or near the teacher. However, learners with visual impairment interact and learn differently and as a compensation, use verbalism strategy in learning the language.

## METHODOLOGY

Sighted learners learn language based on the strategy and approached that teachers provide through different materials such as photos, pictures,



movies and videos, flash cards, demonstrations and pantomime, which are helpful for them. They associate the language with concrete, real-life examples. Coming to the practical point of teaching learners with visual impairment it should be stated that materials as visuals, pictures, flashcards, demonstratives etc. would not work with blind students. For them such materials and resources should be explored by the sense of touch. Accordingly, one way to help visually impaired learners in learning the language should done via realism. Sense of touch works well with them and teachers should provide some real objects which learners could touch exploring topic related vocabulary by possibility. This strategy delivers vocabulary concept more clearly to them, and they can build certain concept as well.

The next practical way is teaching through listening. Here teachers could deliver materials based on the listening sensory. Though, it is challenging to teach/learn written language via listening and different coding systems for visually impaired learners as braille, slate and stylus systems could solve the problem. For example, Braille code system is helpful to visualize written handouts for them, but the problem is that not all are fluent in using it: not all blind learners are taught the Braille. That is only those students who are fluent using Braille coding in L1 could easily use it in learning L2, in opposite this systems cannot work at all.

Of course it works different as the degrees of their vision are diverge, some may got blindness from the birth, some get it from injuries, disease or other health reasons having experience of being sighted before, and some have low or limited vision, some have no light. Therefore, the main problem they have is the difficulty or inability of reading. Still those who have any light to see could do it but with a great difficulty: reading close or far. So, what should be kept in mind while teaching learners with visual impairment.

According to Scott Baltisberger (2019) there are some challenges which teachers may face teaching such learners, and each teacher should keep in mind them while teaching:

- Learners' self-esteem
- Learners' motivation
- Learners' feeling on the importance of literacy is high and they may feel that they will not get it
- Braille code format could be unknown for both teachers and/or learners
- Learners may feel disconnected from peers
- Learners could not read gestures and body language
- Teachers always have to modify own materials

- Teachers or helpers may overcompensate (e.g., inadvertently giving answers away by placing stress on the correct or incorrect word)

Not all visually impaired learners get education in special educational establishments. Many are studying with sighted peers at schools, colleges and universities. One of the important matter that have to keep in mind is treating them as equal with the rest in the classroom. As usual, disabled people appreciate when they are treated equally and to show special care for them demonstrating their disability can abuse them. In addition, it is natural to modify activities for visually limited ones; still sighted learners should not suffer from the created situation. Educators always should modify activities to help visually impaired learners to be engaged. Scott Baltisberger (2019) stated that activities mentioned below should be carefully modified while teaching English in language learning classrooms with visually disabled learners.

- Spot the differences
- Describe one's surroundings
- Match the vocabulary to the definition
- Comment on the chart or diagram
- Comment on or play with flashcards (unless large size for visually impaired)
- Complete picture-based exercises
- Fill in the blanks
- Unscramble the words

Besides all above Scott Baltisberger (2019) suggested some tools and aids, which simplify the life of both teachers and visually impaired learners. The only case is the budget. They certainly beneficial for the learners and they may have some of their own. The following tools and devices are also important in teaching the language for blind students.

- screen readers
- touch screens with voice
- Braille devices
- MP3 players
- podcasts
- audiobooks
- video galleries
- magnifying glasses
- magnified screens
- real objects
- large wall charts
- table lamps
- large print books

Having analysed researches done on the filed we can conclude that educators teaching language for visually impaired classes or classes that include such learners should keep in mind the following suggested tips.



- It is essential always to be near the learners and control them regularly to clarify if they need any help. Here teachers should be very careful and help them only if they asked.
- As blind learners need for help any time, asking and assigning sighted learners to help visually impaired mates to move in the classroom if they need will avoid challenging situations.
- If questions or clarifications, educators better to speak directly to the student. This could raise learner's individuality.
- As they mainly base on sensory skills, minimizing background noise could create effective learning atmosphere.
- Eliminating physical objects in doorways and aisles promotes safety from injuries.
- Highlighting all main points of a lesson should be done orally, as they receive information via listening better.
- Always addressing with the name to the student and identifying name of student who is speaking encourages to study;
- Sharing videos ahead of time so that the learners can preview provides effective timing and learning;
- Providing a larger workspace or table to accommodate laptop or other tools help them to feel comfort, avoid feeling discomfort in little space.
- The form of receiving (electronically or verbally) feedback and assessment is better to be discussed with the students and define the form they want to receive.

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## CONCLUSION

Visually impaired students as above discussed need for special and sometimes individual way in teaching the language since they are diverge in the disability they have. For some category who have low or limited vision big posters with a big and bold letters are effective, for other categories special coding system is essential in getting writing literacy and so on. However, teaching strategies for both sighted and blind students are approximately the same as discussed in this article. The only thing is the teachers' effort and engagement in modifying and building proper learning atmosphere, where they could follow presented suggestions and tips. If to care on the worries of their progress, I do believe that they can learn the language as effectively and get best results in the same step as sighted learners.



## MARINE MACROALGAE: PLANT GROWTH STIMULATORS

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### ABSTRACT

The modern agricultural sector is mainly dependent on synthetic fertilizer for enhancing the growth of crop improvements but a burden of inorganic and chemical-based fertilizer currently created a serious threat to human health as well as the soil environment. Fertilizer research is therefore focusing on an alternative to chemical fertilizer by exploiting natural sources such as marine macroalgae or seaweed. The use of seaweed will be an eco-friendlier approach to sustainable agriculture. Marine macroalgae or seaweed widely applicable in plant growth enhancements due to the presence of biological active phycocompounds such as proteins, phenolic compounds, amino acids, polysaccharides, plant-growth-promoting hormones, and some growth factors, etc. Several research studies have been carried out on the applicability of seaweed or the effect of marine algae or its components on plants and its quality. These types of constituents play their role in improving the morphological as well as biochemical characteristics of plants. The present review study focuses on the applicability of marine macroalgae as a biofertilizer or plant growth stimulator in agricultural applications. This study further helps to improve the nutritional quality of crops which prove to be useful in further investigations and applications.

**KEYWORDS:** Seaweed, Marine Macroalgae, Biofertilizer, Growth stimulator, Agriculture



## 1. INTRODUCTION

Generally, soils rarely have adequate essential micro and macronutrients for plant growth development. Therefore, fertilizers are necessary to apply soil for increasing crop productivity in terms of yield and quality.[1, 2] Fertilizer can be defined as any component or material which is added to the soil to fill adequacy of plant nutrients and enhance a number of the plant growth characteristics. It can be classified into two different groups: One is organic or natural fertilizer and another is Inorganic or synthetic fertilizer.[3] Chemical fertilizer contains inorganic chemical components like triple superphosphate, potassium chloride, nitrogen, urea, anhydrous ammonia, etc. These types of chemical constituents or artificial fertilizers are mostly non-biodegradable.[3, 4]

Chemical fertilizers have both negative and positive impacts. Besides advantages, it becomes harmful after long time applications. The use of chemical fertilizers could lead to serious soil acidification, change in soil pH, degrades the soil health and quality, damage plant's morphological as well as nutritional characteristics, and also cause soil pollution.[5] These types of fertilizers kill beneficial microorganisms of soil those are helpful to convert dead animal and plant into nutrient-rich organic matter and important for the biogeochemical cycle. These microorganisms are also useful to convert atmospheric nitrogen to nitrate. Chemical fertilizers increase the nitrate levels of soil and cause soil pollution. These chemical fertilizers contain a high amount of nitrogen, phosphate, and potassium that leach into groundwater and causing water pollution and disrupt aquatic ecosystems.[6] The presence high amount of phosphates, nitrates, mercury, cadmium, arsenic, lead, etc. causes major water and soil pollution.[7, 8, 9,10] All in all, these types of synthetic chemical fertilizers are harmful to all living matter.

To overcome these demerits of chemical fertilizer, biofertilizer is widely applicable in the diversified form in various regions of the world.[11] Various natural materials like animal by-products, animal wastes, crop residues, compost, and many other by-products of living microorganisms as well as bacteria, composted vegetable materials, etc. can be used as a biofertilizer or in its formulation.[12] These fertilizers are easily biodegradable by numerous microorganisms. Besides, this organic or biofertilizer can be prepare from various materials such as Manure, slurry, worm castings, peat, seaweed, sewage, and guano.[13]

The physical and chemical properties may nourish by using organic manures or fertilizers. There are various benefits include it increases soil fertility, crop production, increase the water holding capacity

of the soil, and also help to maintain pH.[14,15] Also, it supplements nutrients and improves the biological properties of soil. [16] It has been proven to be highly beneficial for soil as well as its microorganisms. This is an alternative way to reduce the hazardous effects and cost of chemical fertilizers. Besides some other benefits such as protect plants from diseases, improve biological processes such as nitrogen fixation, phosphate solubilization, increase carbon fixation, etc.[17]

Recently, seaweed or marine algae is widely used as a biofertilizer. Seaweed is similarly known as marine macroalgae, macroscopic, multicellular, eukaryotic, photosynthetic marine plant. It has been found attached with rock, sand particles, shells, pebbles, or other marine plants. Mainly, it can be divided into three types based on its photosynthetic pigment as green alga (Chlorophyta), red alga (Rhodophyta), and brown alga (Phaeophyta). Seaweed is widely distributed among the Indian coastline which is more than 7500 km. It is widely distributed on the coast of Tamilnadu, the Western coast of Gujarat, the Gulf of Mannar, Andaman Nicobar, Tuticorin, Kerala, Visakhapatnam, etc.[18, 19, 20] Gujarat has about 1600 km longest coastline which is rich in marine algae diversity. On the western coast of Gujarat, there are many sites such as Dwarka, Beyt Dwarka, Veraval, Okha, Bhavani, Mundra, etc.[21, 22] Seaweed is an alternative way to improve crop yields and for promoting the growth of plants.[23, 24]

Marine macroalgae are rich in diversified chemical constituents such as amino acids, fatty acids, carbohydrates, proteins, lipids, vitamins, minerals, micro, and macronutrients, hormones, enzymes, growth factors such as plant growth-promoting hormones, betaine, algin, etc. Due to the presence of such active phycoconstituents, it can be used in various applications such as the Dairy industry, Pharmaceutical, Agriculture, Food and medicine, Polymer industry, etc. The present review study aims to check the applicability of marine algae as a biofertilizer. This study reviewed different marine algae, its hormone, and their effect on plant growth by different means.

There are various beneficial effects of biofertilizer on plants prepared from marine macroalgae or its components. Different types of marine macroalgae have plant growth-stimulating effects on the plant in terms of morphology (root and shoot parameters) as well as biochemical characteristics (pigment content, etc.) reviewed and tabulated in table 1(See Appendix). Many researchers reported promoting the effect of seaweed on seed germination, plant growth, and soil health.[25-28] Some other benefits include stimulation of seed germination, enhance shoot and root elongation, improve plant health, remediation of pollutants of



polluted and contaminated soil, resistance towards pathogenic infections, improved water, and nutrient uptake by root elongation, etc.[29, 30, 31] It also contains essential macro and microelements as well as trace elements.[32] Along with, macroalgae contain natural plant-growth-promoting hormones or regulators such as auxin, cytokinin, and abscisic acid-like substances that enhance growth and crop yield.[33, 34, 35]

Role of Phycocompounds derived from marine macroalgae

One of the plant growth hormones, auxin played its role in many physiological and biological functions of the plants as well as in developments of plant resistance to pathogens attack as well as reduce abiotic stress.[36, 37] Likewise, gibberellins hormone has a central role in response to abiotic stress and fruit development.[38, 39] Many researchers found Indole -3- acetic acid (IAA) and another hormone from marine algae that stimulate plant growth and development characteristics.[40] Cytokinins affected plants during the whole cell cycle and influence numerous developmental programs.[41] It is found in many marine macroalgae such as *Porphyra perforata*, *Sargassum muticum* as well as in green algae *Chara globularis*. [42, 43] Along with, Macro and micronutrients Nitrogen (N), Phosphorous (P), Potassium (K), Calcium (Ca), Magnesium (Mg), Sulphur (S), etc. are very needful for enhancing plant growth that found in seaweed.[6]

Nitrogen has a very essential role in the biochemical and physical functions of plants, nitrogen fixation as well as improve morphological growth.[44, 45] Potassium contributes to an important role in survival under drought stress.[46, 47] Besides, Phosphorus played a major role in seed germination, seedling establishment, and seed development.[48] Like Potassium, Calcium is essential for the resistance of the plants to disease and supports many metabolic processes.[49] Magnesium is required by plants in abiotic stress tolerance. It also plays its role in root and shoots formation, improves photosynthesis.[50, 51] Sulfur is countable as the fourth essential element after nitrogen, phosphorus, and potassium for the functioning of enzymes and protect against oxidative stress.[52] Copper proved itself as an antifungal agent and play its role in photosynthesis and respiratory electron transport chains.[53, 54] Iron is involved in the synthesis of chlorophyll in plants and improve photosynthesis.[55] Manganese played a significant role in oxidation and reduction processes in plants and responsible for the activation of many enzymes.[56, 57] Molybdenum micronutrient is required as catalytically active metal.[58] Deficiencies of zinc can affect a plant by stunting its growth, decreasing the number of fillers, chlorosis,

and smaller leaves.[59] Boron is essential for the active growth of root tips and new leaf.[60] Likewise, Silicon alleviates biotic and abiotic stresses in plants.[61] Cobalt is helpful for the formation of leghemoglobin which is involved in the nitrogen fixation process in nodules of leguminous plants.[62]

Michalak et al. (2015) studied biostimulant properties of seaweed extracts by microwave extraction at different temperatures. In all the extracts, they found Na, K, and Ca at higher concentrations.[63] Extract of *Saccorhiza polyschides* is a potential source of essential macro and trace elements studied by Cristina Soares et al. (2020).[64] Lotze et al. (2016) found P, K, and Na macroelements at higher concentrations in three commercial Seaweeds.[65] Godlewska et al. (2017 & 2016) prepared different seaweed extracts by using an aqueous solution with different pH and temperature. In all extracts, they were found Na, K, and Mg present at higher concentrations.[66, 67] Various research studies have been carried out on marine macroalgae, micro, and macronutrients and their effects on plant growth tabulated in table no. 2 (See Appendix).

## 2. CONCLUSION

A little review study has been carried out to highlight the applicability of seaweed as a biofertilizer. Trends towards natural resources like marine algae best suitable and increase in demand for biofertilization and created various opportunities to reinvestigate the merits and demerits of macroalgal applications. Further, this study helpful to researchers for finding out a piece of information on the seasonal and geographic variability in the specific phycocompounds content found in marine macroalgae to protect plants from pathogens (bacterial, fungal or viral, etc.) as well as improve quality in terms of various parameters such as biochemical composition, morphological parameters in terms of increasing numbers of leaves, branch, stems, flowers, fruits, etc. It is well studied that marine algae are very rich in different types of active constituents which make them resistant to different climatic and environmental stresses and which could also enhance the fertility of agricultural soils and crops. This is surely one of the promising tasks for future investigation and development.

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**APPENDIX****Table:1 Role of different marine algae, hormone, and plant growth-promoting effects**

No.	Type of algae	Name of algae	Name of hormone/ regulators	Name of plant	Plant growth effect	References
1.	Brown algae	<i>Durvillea potatorum</i>	Cytokinins	Soybean	Liquid fertilizer	68,69
2.	Brown algae	<i>Ascophyllum nodosum</i>	IAA	Arabidopsis plant	Increasing the root and shoot growth	70
3.	Brown algae	Kelp	Auxin, Ck	Tomato	Promoted root growth	71,72
4.	Red-green algae	<i>Polysiphonia fucoides</i> , <i>Ulva fleruosa</i> , <i>Ulva clathrate</i> , <i>Cladophora glomerata</i>	Auxins, Cytokinins, Polyphenols	Garden cress ( <i>Lepidium sativum L.</i> ), Wheat ( <i>Triticum aestivum</i> )	Enhanced chlorophyll 2 and carotenoid in plant shoot as well as root thickness and above-ground biomass	73
5.	Green-brown algae	<i>Caulerpa scalpelliformis</i> , <i>Gracilaria corticata</i>	BAP IBA	<i>Lycopersicon esculentum L.</i> (tomato)	endogenous plant growth regulators that enhance the growth of the plant at in vitro and in vivo condition	74
6.	Brown algae	<i>Ecklonia maxima</i>	Abscisic acid, Gibberellin, Brassinosteroids	Agricultural plants (rice, wheat)	Increased root and shoot growth, improve nutrient uptake	75
7.	Brown algae	<i>Ascophyllum nodosum</i>	Abscisic acid Gibberellic acid	Barley	enhanced germination and seedling vigor in barley	76
8.	Brown algae	<i>Gracilaria edulis</i> , <i>Sargassum wightii</i>	Cytokinins, IAA (indole 3 acetic acid) IBA	Tomato ( <i>Lycopersicon esculentum</i> )	Provide a basis for the production of transgenics with high frequency and survivability of tomato plants	77
9.	Red algae	<i>Kappaphycus alvarezii</i>	Indole 3-acetic acid Gibberellin GA3 Kinetin Zeatin	-	-	78



10.	Brown algae	<i>Ecklonia maxima</i>	indole-3-acetic acid (IAA) indole-3-carboxylic acid (ICA) indole-3-aldehyde (IAld) indole-3-acetamide (IAcet) Tryptophan (TRP)	Mung bean	Increasing rooting in mung bean and improve plant growth	79
11.	Brown algae	<i>Ascophyllum nodosum</i>	Indole-3-acetic acid (Auxins)	-	Improve growth by foliar uptake	80
12.	Green algae	<i>Ulva intestinalis</i>	Cytokinins	Arabidopsis thaliana	Low concentration stimulated root growth	81
13.	Brown algae	<i>Ascophyllum nodosum</i>	Abscisic acid	-	Regulate the growth of plants	82
14.	Green algae	<i>Chara globularis</i>	Cytokinins	-	Regulate the growth of plants	43
15.	Red algae	<i>Prionitis lanceolata</i>	3-hydroxyl indole	Lettuce	Stimulate root growth	83
16.	Brown-green algae	<i>Sargassum wightii</i> , <i>Ulva lactuca</i>	Cytokinins, Gibberellin, Auxins	Cluster bean (guar plant)	increased the growth of shoot length.	84
17.	Brown algae	<i>Stoechospermum marginatum</i>	Auxin Cytokinin Gibberellin	Brinjal	Lower concentration show promoting effect on growth and productivity of brinjal plants	85

**Table:2 Different micro and macro elements of seaweed and its agricultural benefits**

NO	NAME OF ALGAE	NAME OF MACRO AND MICRO ELEMENTS	Application	REFERENCES
1	<i>Laurencia obtuse</i> , <i>Corallina elongate</i> , <i>Jania rubens</i>	N, K, P	growth parameters	86
2	<i>Sargassum johnstonii</i>	Ca, Mg, Na, K, Fe, Cu, Zn, Mn	biofertilizer	87
3	<i>Kappaphycus alvarezii</i>	N, P, K, S	Foliar application	88
4	<i>Kappaphycus</i> , <i>Gracilaria</i>	N, P, K	Foliar application	89
5	<i>Stictosiphonia arbuscula</i> , <i>Apophlae alyallii</i> , <i>Scytothamnus australis</i> , <i>Xiphophora gladiata</i>	C, N	Agricultural application	90
6	<i>Stoechospermum marginatum</i>	Cu, Mg, Zn, Fe, K, Mg, Co, Na	Biofertilizer	91
7	<i>Ascophyllum nodosum</i>	N, P, K, B, Fe, Mn	Foliar application	92
8	<i>Saccorhiza polyschides</i>	K, Na, S, Ca, Mg, Zn, B, Cl, P, Mo, V, Se, I, N, Fe, Mn, Br, Cr, Cd	Agricultural application	93



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# STUDY OF FLUORIDE IN GROUNDWATER OF KHARGONE TOWN (M.P.) WITH REFERENCE TO IT'S IMPACT ON HUMAN HEALTH

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## ABSTRACT

“Groundwater is the water present beneath Earth’s surface in soil pore spaces and in the fractures of rock formations”. The earth is full of natural resources needed for the development of mankind. The ground water is not suitable for drinking and other purposes. Generally the groundwater is considered least polluted as compared to surface water. Fluoride is a chemical element which is found in groundwater and has become one of the most important toxicological environmental hazards globally. High range of fluoride in drinking water it causes fluorosis disease. The fluoride condition were detected in ground water of khargone town. A large population of khargone town is using groundwater for drinking and domestic purposes.

**KEYWORDS :** Groundwater, Fluoride, Well, Tubewell, Handpump.

## INTRODUCTION

Groundwater sources can become contaminated with chemicals as those used in fertilizers and pesticides and germs, Such as bacteria, viruses and parasites. We know very well that water plays an essential role in human life. Water is used for many purpose like drinking, cooking, bathing, washing and irrigation. Fluoride is mineral which is found naturally in the soil, rocks and water. Fluoride is beneficial for teeth. The permissible limit of fluoride is 1.0 mg/l by WHO and BIS. Above 1.0 mg/l fluoride cause fluorosis disease in human body. Fluoride used in toothpaste to improve dental health care. Dental fluorosis may be an important complication of diabetes insipidus and demonstrate the possibility that excessive consumption of optimally fluoridated water can lead to sever development enamel defects (Seow and Thomsett 1994). A large population of khargone town is using groundwater for drinking purpose. This study is to know the fluoride level in groundwater and its suitability for drinking purpose at khargone town, M.P. for this object 6 groundwater sampling station were monitored during 2008 seasonally.

## MATERIAL AND METHOD

**Study Area :** Khargone town was selected for the present study. It’s a part of west Nimar zone.

**Location :** Khargone is district place of Madhya Pradesh. Khargone district lies between north latitudes 22° 47’ and 22° 35’ and east longitudes 75° 19’ and 76° 14’ in parts of survey of India.

**Sampling stations :** The 6 sampling stations were selected randomly in different area of khargone town. Which cover all the direction of the town. These sampling stations are combination of 2 handpump, 2 tubewell and 2 open well. All the sampling stations were monitored seasonally. Detail of sampling stations is as under:-

- Hand pumps : (i) Nutan nagar (ii) BTI colony
- Wells : (i) Brijvihar colony (ii) Krishniupaj mandi
- Tube wells : (i) Gouridham (ii) Jyoti nagar.

**Collection, observation :-** water samples were collected from these stations and testing was done as per the standard methods described by APHA (1992). The data was collected seasonally i.e. Rainy, winter, and summer.

## RESULT AND DISCUSSION

The result of fluoride level of groundwater is represented in table (1 to 3). It is an established fact that maintenance of healthy aquatic system depends on minerals and physico – chemical properties of water. The fluoride value of Nutan nagr hand pump



water was 0.03 mg/l in rainy season and 0.04 mg/l in winter season. In summer season it was dried due to high temperature. The variability in heterogeneous urban populations may be too high for the effect, if any of low level fluoride administration on skeletal tissues to be discerned (Charchra et al., 2010). Persons with renal failures can have a four fold increase in skeletal fluoride content are at more risk of spontaneous bone features and akin to skeletal fluorosis even at 1.0 ppm fluoride in drinking water (Ayoob and Gupta 2006). The fluoride value of BTI colony hand pump water was 0.02 mg/l in rainy and 0.01 mg/l in winter season. The fluoride value of well water of Brijviah colony and Krishi upaj mandi were nil (free from fluoride). The fluoride level of tubewell water of Gouridham was also nil. The fluoride level of tubewell water of Jyoti nagar was

0.01 mg/l in rainy season and 0.01 mg/l in winter season. It was dried in summer season. The intake of elevated fluoride has a significant impact on human health; specially immediate problems that are seen in children's teeth (Narsimha and Rajitha 2018).

I observed higher value in rainy season. It may be in groundwater is because of natural or anthropogenic causes or a combination of both several rocks have fluoride bearing minerals. High fluoride concentration has lifelong health impacts ranged from loss of teeth to debilitating pain (Demelash et.al., 2019). The weathering of these rocks and infiltration of rainfall through in increase fluoride concentration in groundwater consumption of water with fluoride concentration above 1.5 mg/l result in acute to chronic dental fluorosis (Brindha and Elango 2011).

**Table - 1 : Fluoride level of water of handpumps.**

S.No.	Season	Stations	
		Nutan nagar	BTI colony
1	Rainy	0.03	0.02
2	Winter	0.02	0.01
3	Summer	Dried	Dried

**Table - 2 : Fluoride level of water of Wells.**

S.No.	Season	Stations	
		Brijvihar	Krishi upaj mandi
1	Rainy	0.00	0.00
2	Winter	0.00	0.00
3	Summer	0.00	0.00

**Table - 3 : Fluoride level of water of tubewells.**

S.No.	Season	Stations	
		Gouridham	Jyoti nagar
1	Rainy	0.00	0.01
2	Winter	0.00	0.01
3	Summer	0.00	Dried

## CONCLUSION

The fluoride content of all the groundwater samples of present study were under the desirable limit of WHO and BIS i.e. 1.00 – 1.5 mg/l. It is in agreement with the study of Dhakad and Choudhary (2004). We have to be use the clean water. Fluorided water sources should be avoid and go for other sources. We have to be treat the groundwater by insitu and exsitu treatment method like Distillation, Reverse osmosis, Activated alumina, Bone char carbon etc.

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# **IMPACT OF COVID-19 ON PRIVATE PLANT NURSERY BUSINESS: A CASE STUDY OF SYLHET DISTRICT, BANGLADESH**

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## **ABSTRACT**

*The Plant nursery industry is an integrated section of the afforestation program in Bangladesh. Around 18000 plant nurseries are playing a vital role in employment creation and income generation. But due to Covid-19 shutdown, this industry faced a lot of difficulties. Considering the importance, this research was performed in Sylhet district to trace out the pandemic impact on private plant nursery business. Randomly 31 nurseries were selected to fulfill the objective and data were collected using semi-structured questionnaires through direct interviews. In the questionnaire, 5 points Likert scale was used to collect responses of nursery traders. The study analyzed the socio-economic attributes of nursery traders. The conducted survey found out nursery input, transport, and selling tasks were affected most owing to the pandemic and it forced them to adopt several strategies to manage the loss. The study also revealed important suggestions and recommendations for the betterment of the nursery industry which are expected to help students, researchers, policymakers, and entrepreneurs.*

**KEYWORDS:** Covid-19, Impact, Nursery, Case study, Sylhet, Bangladesh.



## I. INTRODUCTION

To sustain the balance of ecology it is required to have 25 percent of forest land in a country. But overpopulation, unplanned urbanization, industrialization have caused a serious ecological imbalance in Bangladesh. The forest area of Bangladesh has been recorded to cover 25% of the entire land in 1936 but at present, this has declined to 10.96% of the entire land (WB, 2016). In 1994, the target of Bangladesh's National Forest Policy was to ensure 20 percent of the nation's forests and trees cover. To increase afforestation, in the mid of the 19<sup>th</sup> century, Forest Department (FD) first introduce plant nurseries in Bangladesh for producing forest trees but later they enlarged their nurseries to commercial fruit trees on Government level (Amin, 2016). Few private nurseries were flourished and exhibited in the twentieth century. And now this particular sector is the largest division (Amin, 2016). Nurseries have become an integral section of afforestation program. As a consequence, need for nurseries is constantly increasing and new nurseries are emerging. As the nursery business field is growing, educated entrepreneurs are joining this business and thus creating employment opportunities. At present around 18000 nurseries in Bangladesh at where 69000 families are associated partially or fully rely on the plant nurseries for their living (Amin, 2016). Around 0.2 million people are directly associated with nurseries and 0.15 million number of farmers are connected with commercial horticulture and floriculture business (ITR, 2015). Nurseries are playing a vital role to sustain cities and towns. It is increasing greeneries and also have great contribution to the local economy and national economy.

In December 2019, Covid-19 contagious virus detected in Wuhan, China. The virus devastated quickly throughout the world and World Health Organization(WHO) declared it a pandemic. As per Worldometer (January12,2021) almost 1.95 Million people died. 8 March 2020, Bangladesh observed the first coronavirus cases. After detection, the Bangladesh government declared a lockdown. The lockdown effect has broken the synchronization of demand and supply, the chain of supply along with relationship with producers and workers also messed up. Overall activity from production to selling was interrupted. The lockdown has affected the income of 500 families in Narayanganj district who were involved in flower production and marketing (Kumar, 2020). Covid-19 pandemic slowed down flower production and commercialization with TK 250 crores loss (Bhuyan, 2020). A supply chain expert predicted that present marketing condition may hamper obtaining growth of total income (Kumar, 2020).

In Bangladesh, few studies have been carried out to found out Covid-19 impact on agriculture and

related sectors (Begum et al., 2020; Kumar, 2020; Sarwar et al., 2020). But no research has been found about Covid-19 impact on plant nurseries. There are few studies on nursery business in Bangladesh ( ISLAM, 2006; Haque et al., 2007; Amin, 2016; BARI, 2016 ). In there, only one study found which is related to plant nurseries in the Sylhet region (Ahmed et al., 2008). Therefore, considering the facts, it has become necessary to examine the present status of the nursery business in Sylhet district. This study had conducted by following the survey method in Sylhet district, Bangladesh. The specific purpose of the conducted study-

- Analyze the socio-economic attributes of private plant nursery business owners.
- Find out which nursery activities were affected most due to shut down.
- Owner adaptation strategy to manage the pandemic impact.
- Owner choice of suggestion overcoming the pandemic effect.

The findings will help the policymakers to understand better about the current condition of nursery business. It is expected that policymakers would contribute in formulating effective policies for expansion of this industry. Likewise, entrepreneurs will understand the situation of the nursery business and there are further possibilities for the researcher to do more research.

## II. METHODOLOGY

### Study Area

The survey-based research was performed in Sylhet district, north-eastern part of Bangladesh. The coordinates of Sylhet 24° 30'N and 91° 40'E.

### Sources of Data

To collect primary data a survey was carried out from 28<sup>th</sup> October 2020 to 10<sup>th</sup> December 2020. Secondary data has been obtained from the journal, research articles, websites, and newspapers.

### Sample size and sampling technique

To select nursery a simple random sampling was used. Randomly 31 nurseries were selected to collect data at the studied area.

### Collection of Data

Data were collected by authors themselves. All the survey information was collected during the daytime and all precautionary measures of COVID-19 were maintained during data collection. Responses were collected by using semi-structured questionnaires through face-to-face interviews. 5 points Likert scale (5=Strongly agree, 4=agree, 3=neutral, 2=disagree, 1=strongly disagree) was used to fulfill objectives of this study.

### Analytical technique

Collected data were tabulated and analyzed by descriptive statistics such as frequency, percentage, mean derived from 5 points Likert type scale.



### III.RESULTS AND DISCUSSION

#### Socio-economic Attributes

The study found that (Table 1), In the study area 100 percent of plant nursery business owners were male. It indicates commercial nursery business is dominated through males. A study discovered a similar observation which was performed in the Dhaka district, Bangladesh(Amin, 2016). Bangladesh is the toughest place for female business owners because women continue to be restrained by deeply rooted socio-cultural alongside financial constraints(Bangladesh, 2020). Among the owners, 29 percent were young adults (age between 18-35) and 71 percent were middle-aged adults (age between 36-55). Above 55 age no owner was found. It indicates middle-aged entrepreneurs are more active in this business. The Majority of owners were

educated. Around 48.39 percent obtained tertiary education,38.71 percent had secondary education and 12.9 percent had primary education. They agreed that education has vital role in decision making, adaptation ability and developing economically. It's a clear indication of educated young participation as educated populace are highly joining this business. At Sylhet, the study revealed that 54.84 percent of owners established their nurseries in their land and 45.16 percent developed their nurseries by taking land as lease. Although there are lots of fallow land in Sylhet district. Still, there are issues to use those land for the nursery business. 58.06 percent of owners developed their nurseries between 30-60 decimal of land where 29.03 percent and 12.90 percent of owners conducted their nurseries above 60 decimals and

**Table 1. Socio-economic attributes of private plant nursery business owners at Sylhet, Bangladesh. (n=31)**

Variable		Percentage
<b>Gender</b>	Male	100
	Female	0.00
<b>Age(years)</b>	Young age adult ( 18-35 )	29
	Middle age adult ( 36-55 )	71
	Old age adult ( 55< )	0.00
<b>Level of education</b>	No formal education	0.00
	Primary education	12.90
	Secondary education	38.71
	Tertiary education	48.39
<b>Size of nursery(Decimal)</b>	<30	12.90
	30-60	58.06
	60<	29.03
<b>Land ownership</b>	Self	54.84
	Lease	45.16
<b>Business experience (years)</b>	1-5	3.23
	6-10	51.61
	11-15	32.26
	15<	12.90
<b>Training experience</b>	Yes	6.45
	No	93.55
<b>Participation in tree fair</b>	Yes	58.06
	No	41.94
<b>Sources of Capital</b>	Self	90.32
	Bank	9.68



	NGO	0.00
	Others	0.00
<b>Annual income (Crore)</b>	>1	35.48
	1-2	32.26
	2<	32.26

below 30 decimals of land respectively. Experience is always vital factor that helps an entrepreneur to manage a business more smoothly and efficiently (Mamun et al., 2018). Around 51.61 percent of owners were experienced in doing business for 6-10 years. 32.26 percent had experience for 11-15 years and 12.90 percent had experience above 16 years and only 3.23 percent of respondents had experienced between 1-5 years. Training paves way of skill acquisition technique and knowledge but a greater part of the owners received no training (93.55 percent). Tree fair is always great way to add extra income alongside the marketing of nursery. 58.06 percent of owners attended in tree fair. This outcome revealed that owners did not take a loan from Non-Government Organization(NGO). Though nursery owners are interested in taking loan from bank but only 9.68 percent of owners have taken a loan from bank. A large portion around 90.32 percent of owners established their business by self-capital. Income level determines the financial status of a business. Around 35.48 percent of owner annual income was below one crore taka, 32.26 percent have an annual income between one to two crore taka and 32.26 percent of owners have annual income above two crores taka.

#### **Nursery Owner perception on the impact of Covid-19 in the plant nursery**

It was found from the conducted study (Table 2), a significant proportion of nursery owners agreed with such statement of, "Problem was high in transportation of nursery material" (100%), "Production cost has increased a lot" (100%), "Selling of product has decreased a lot" (100%), "No advisory services were gained from agricultural representative" (97%), "Input material price has increased a lot" (94%), "Product marketing problem has increased" (81%), "Accessing in credit facilities were very difficult" (77%), "Product price has decreased" (68%), "availability of materials was limited" (55%) ". Meanwhile, a substantial number of nursery owners disagreed with the statements of "difficulties were high in performing daily activities"

(77%), "labor wage was increased a lot" (90%), "monitoring problem was high"(97%), "labor availability was limited" (100%), "problem faced during new plant production" (100%), "management problem was high" (100%), "wide number of product was damaged" (100%) and "storage problem was high" (100%)".It means Covid-19 has affected the nursery business and owners recognized which activity faced difficulties and interruption throughout the shutdown. All kind of transportation system, even people's movement were restricted in Sylhet (*Coronavirus*, 2020). Consequently, input material was limited and the price increased a lot which increased total production cost. But owing to restriction, buyers decreased alongside product prices also decreased. Agricultural representatives were also failed to provide information. Also, small farmers and businessmen could not be able to access Government loan facilities (Uttom, 2020). Opposed to, owners faced the least difficulties in performing daily activities, management activities. Owing to the availability of laborers, the monitoring of management activities was not harder. Moreover, no problem was faced in the storing of plants. The finding is congruent with a report which was conducted by BRAC at the farmer level in Bangladesh revealed that Covid-19 shutdown caused production problem, marketing problem, lack of decent prices, higher price of input, and limited operation of markets(*BDT 565bn Loss in Farmers' Income in 45 Days*, 2020). This study supports several studies of Bangladesh that were conducted finding out the impact level of the Covid-19 in agriculture (Bhuyan, 2020; Kumar, 2020; Mannan, 2020). However, one study reported that sales had risen while the lockdown eased but the corporate sale and NGO sales had dropped to 50% and 40% respectively

**Table 2. Nursery owner perception on the impact of covid-19 in the Plant nursery business. (n=31)**

Impact	%Agree	%Disagree	%Neutral
Problem was high in transportation of nursery material	100	0	0
Production cost has increased a lot	100	0	0
Selling of product has decreased a lot	100	0	0
No advisory services were gained from agricultural representative	97	3	0
Input material price has increased a lot	94	0	6
Product marketing problem has increased	81	19	0
Accessing to credit facilities were very difficult	77	23	0
Product price has decreased	68	32	0
Material availability was limited	55	42	3
Difficulty was high in performing daily activities	16	77	6
Labor wage has increased a lot	10	90	0
Monitoring Problem was high	3	97	0
Labor availability was limited	0	100	0
Problem faced during production of new plant	0	100	0
Management problem was high	0	100	0
Wide number of product has damaged	0	100	0
Storage problem was high	0	100	0

Original Scale: 1=Strongly Disagree, 2=Disagree, 3=Neutral, 4=Agree, 5=Strongly Agree  
Responses were collapsed into: Agree, Neutral, and Disagree.

**Adaptation strategies**

Beginning of the lockdown was most difficult time for business. To manage pandemic impact nursery owners intended to follow diverse types of strategies. The analysis found that (Table 3), a major portion of nursery traders (35.48%) depended on savings. Low investment and high profits in the nursery business enable nursery owners to be reliant

**Table 3. Nursery Owner's adaptation strategies to manage the pandemic impact. (n=31)**

Strategy	Percentage
No plan	9.67
Increased alternate income source	6.45
Depended on savings	35.48
Sold asset	12.90
Started online sale	29.03
Reduced production of new plant	6.45

on savings. 29.03% owners started the online sale, it worked significantly. Online sales have increased by 70-80 percent in pandemic since the past time (Hasan, 2020). 12.90% owners sold their assets and 6.45% owners increased income source. 6.45% reduced new plant production due to decline of sales. 9.67% of the owners had no plan.

**Suggestion to overcome the pandemic loss**

This study found out (Table 4) the most necessary list of suggestion which includes, government should subsidize, special transport service should be commenced to carry nursery material, improvement of marketing channel, government should reduce taxes on import of nursery material, nursery modernization, virtual training program arrangement should be commenced, mobile based information service should be commenced, online platform should be undertaken for only selling nursery product and interest-free loan should be arranged". The greater part of the owners wanted government subsidies to stabilize this industry again. They demanded transport facilities for nursery material. Limited transport caused a miserable impact on marketing and some owners showed priorities on improved marketing channels. Market structure influenced overall nursery activities. Besides the pandemic impact, nursery owners believe that irrelevant practices of middle man, poor communication system, transportation of

**Table 4. Important list of suggestions by nursery owners**

Suggestions	Mean	Rank
Government should Subsidize	4.935	1
Special Transport service should be commenced	4.870	2
Marketing channel required to be improved	4.838	3
Govt. should reduce taxes on import of nursery material	3.677	4
Use of modern technology should be increased	3.612	5
Virtual training service should be commenced	3.548	6
Mobile-based information service should be commenced	3.548	7
Online platform should be commenced only for selling nursery product	3.483	8
Interest free loan should be arranged for nursery traders	3.419	9

(n=31) Cut-off score=3.0 (>3.0 = important suggestion, <3.0 =unimportant suggestion).

products without any storage facilities, unfair prices of products, products damaging are also salient features. Owners were engaged in the importation of nursery material. So, they wanted low tax because high tax increases input material price which led high product prices. In the present situation, it will create more difficulties. Social distance reduced the working efficiency of workers. Modern technology will assist to improve production and management activities. They recommended virtual training services, mobile-based information services so that they could communicate easily and they need not to present physically. They already started online selling but they want a trustable app, website only for selling nursery products will assist to grow business. Owners are not inspired enough due to high-interest rates, delay in loan approval, difficulties in understanding procedures, dissatisfactory client services, time-consuming procedures. They demanded an interest-free loan to decrease the pandemic induced impact.

#### IV. CONCLUSION AND RECOMMENDATIONS

Plant nurseries act as a leading source of plant supply in Sylhet city. Nurseries have a great contribution to employment, environment and secure food security. This study found that mainly nursery input and marketing tasks have been largely affected due to covid-19. Nursery traders are facing losses that have force small traders to omit the business. Consequently, employment has become uncertain for many workers and Sylhet 's sustainability is now under threat. For the prosperity of this industry, the study is providing the following recommendations.

- I. Government and NGOs need to provide easy financial assist for the nursery business. That will attract the young entrepreneur.
- II. This industry has great export potentiality. So, research is required for uplifting this sector. Government and NGO should provide funds for this industry.
- III. The Government should develop a suitable policy to use fallow, unfertile land for establishing nursery.
- IV. This industry needs modernization. New technology will enhance the potency of activity. Modernization will enable this business to drive in the international market.

#### CONFLICT OF INTEREST

The authors declare that they have no competing interests.

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## EMPLOYEE STRESS: A SCOPING REVIEW

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### ABSTRACT

*This study examined employee stress with a view of proffering viable solution to stress situations. An in-depth review of literature was conducted to examine previous research findings with the aim of making contributions on how to minimize employees' stress. Workplace stressors can be physical or psychosocial. It culminates to several disturbing scenarios such as; non-availability of work materials, tools or equipment, noise, uncondusive work environment such as poor lighting, poor office space, bullying or harassment etc. and excessive workloads, ambiguous performance expectations, less control over job-related decisions, fewer opportunities for growth and advancement, conflicting work demands etc. It was therefore recommended that; employees are expected to keep a to-do-list of all their activities in an attempt to identify and track high stressors and to know how to adequately respond to them. Also, employees are advised to seek and get help from trusted colleagues, superiors, friends, and family in a bid to handle stressful situations. Nevertheless, employees are encouraged to develop a healthy lifestyle by eating right and engaging in any form of physical exercise that would help ease stress, take out time to relax, and recharge. Lastly, employees should work within their job description, and only exhibit organizational citizenship behaviour when it is absolutely necessary.*

**KEYWORDS:** *Employee Stress, Job-Demand-Control-Support Model, and Social Support.*

### INTRODUCTION

Having a job to do should be a thing of joy as it gives the job-holder a means of livelihood and boosts the individual's mental health and well-being, nevertheless, some people are stressed out in their workplaces despite the rewards they receive. The reason for this trend in today's workplaces stem from shifting social and business restrictions, changing and uncertain business environment, fulfilling diversity and inclusion responsibilities, talent shortage, and harmonizing current business operations with future strategic thinking. This has led to huge losses in revenue and eventual winding-up of some organizations for those that cannot move with the trend. However, other organizations that are still in business, do almost everything to remain so, including laying-off employees who are perceived as not making valuable contributions to the survival of the organization. This invariably demonstrates that fewer employees are performing the job(s) of a larger percentage of employees who ought to be gainfully employed, thereby leaving these few workers susceptible to health

hazards. Workplace stressors can be physical or psychosocial. It culminates to several disturbing scenarios such as; non-availability of work materials, tools or equipment, noise, uncondusive work environment such as poor lighting, poor office space, etc. and excessive workloads, ambiguous performance expectations, less control over job-related decisions, bullying or harassment, conflicting work demands etc. Stressful working conditions have been known to contribute to the medical challenges of employees. Griffin and Clarke (2010) recorded that employee stress or stressful working conditions have a high tendency of causing problems that had resulted in huge discomfort for employees. They noted that some of such problems include; sleep disturbances, anxiety, headache, high blood pressure, short temper or fuse, weakened immune system, and other related heart diseases. Beehr (2014), and Griffin and Clarke (2010) pointed out some symptoms of stress that negatively affect organizational performance. These symptoms include; escaping from tasks and responsibilities,



presenteeism, absenteeism, arriving late, leaving early, memory loss, deterioration in work performance, more work-related accidents, more error-prone work-outcome, improper eating habits, arguing, anxiety, depression, procrastination, getting irritated, sleeplessness, and so on.

## **THEORETICAL FRAMEWORK**

Studies such as this are traditionally supported with an undergirded model. The aim of this is to provide a basis for which the study could be given an explanation as well as a foundation. This study, therefore, adopts the Job Demand-control- support model, to serve as an undergirded theory for employee stress. **The Job-demand-control-support model** attempts to theoretically explain how the characteristics of a job could influence the psychological wellbeing of employees. Thus, it tries to ascertain the extent to which skill variety, task identity, task significance, autonomy, and feedback could influence employee's psychological wellbeing through identifying these situations and employee's personal characteristics that will be of utmost importance in times of stress (Bakker et al., 2005). It is imperative to note that the job-demand-control-support model was introduced by an American sociologist, Robert Karasek. This model was presented in a study where he attempted to assess stress and stress factors within a work environment or an organization (Bakker & Demeroati, 2007). Karasek and Theorell (1992) noted that demand and control in this sense represents "height of strain" and decision latitude", respectively. Height of strain (demands) connotes certain work requirements such as effort and difficulty, work rate, time and pressure, availability, and so on, which presents themselves as psychological stressors, while; decision latitude (control) connotes the extent to which employees are free to "control and organize" their work in general based on their level of competence and decision-making authority. Hausser et al. (2010), and Karasek and Theorell (1992) pointed out that the height of strain (demands) covers high and low job demands, while decision latitude (control) covers active and passive job control. In other words, the model connotes how various factors such as excess workload, role conflict, role ambiguity, in relation to job demands can result to employee stress. Nevertheless, Karasek and Theorell, (1990) concludes that employees can handle these stressors by employing job skills that gives them the required leverages such as developing a cordial relationship between colleagues and superiors, gaining autonomy and control on the job.

## **CONCEPT OF EMPLOYEE STRESS**

Employee stress can be defined as damaging responses that can arise when the demands of a job is inappropriate with the abilities, resources and expectations of the job-holder. Employee stress comes as a response to certain stimuli. For instance, job stress could be stimulated by job-related factors such as excessive workload, fewer opportunities for development and growth, poor salary scale, delayed salaries, conflicting work demands, ambiguous performance expectations, lack of social support, lack of autonomy and control and so on. Moylan et al. (2013) and Houdmont et al. (2019) submitted that several factors lead to employee stress. These factors are dimensionalized into job concerning factors, organizational factors, individual factors, and extra-organizational factors. Moylan et al. (2013) noted that job concerning factors, includes; lack of confidentiality, crowding, unsafe and unhealthy working conditions, and monotonous nature of the job. Organizational factors include; peer pressure (Hernandez et al. 2014), lack of employee participation in decision-making, strict rules and regulations, management excessive control over employees, goal ambiguity and conflict, poor salary structure, pay discrimination, lack of opportunity for promotion, more centralized and formal organizational structure, and ineffective communication system, and so on. Individual factors may include; expectations from peers, family, superiors, and subordinates, inherent personality traits such as aggressiveness, impatience, and being rigid. Extra-organizational factors such as; technological change, inflation, social responsibilities, and rigid social changes, and so on.

Stress has always been perceived in the negative. Although, this negative component or element of stress is known as "distress". However, stress has its positive outcomes. The positive connotation of stress is eustress. Human beings requires some measure of stress. In this vein, stress has positive outcomes as it brings out the best in individuals and helps them discover newer and smarter ways to get things done (Beehr, 2014; Griffin & Clarke, 2010; Houdmont et al., 2019). Nevertheless, negative outcomes of stress could result in heart disease (Ibrahim et al., 2013). Similarly, deteriorating health has been fingered as one of the several symptoms of employee stress. Stults-Kolehmainen and Sinha (2014), Lee et al. (2013), Marcellino et al. (2014), and Boulton and O'connell (2017) have suggested several factors that could pass for symptoms of employee stress. These factors include; deteriorating work conditions, improper eating habits, absenteeism, sleeplessness,



excessive smoking and drinking, loss of memory, error-prone disposition, escaping from work/duties and/or responsibilities, over-reacting, anxiety, arguing, and accident-prone disposition. Others may include, arriving late and leaving early, and largely deteriorating health conditions, depressed mode, fatigue, headaches, loss of sex drive, trouble concentrating, irritability, stomach problems, muscle tension, social withdrawal, loss of interest in work, and excessive use of alcohol and drugs.

### **MANAGING EMPLOYEE STRESS**

Although, several researchers (e.g. Moylan et al., 2013; Marcellino et al., 2014; de Terte & Stephens, 2014) have suggested ways to adequately manage stress. It is believed that employee stress takes a negative toll on the individual health of employees as well as their performance outcome on the job. Hence the need to address issues of stress as it obviously comes with harmful consequences. In the light of these, employee stress can be managed using individual and organizational strategies. For organizational level strategies, employee stress could be tackled by appreciating employees upon task completion, meeting and exceeding targets, encouraging decentralization, encourage employee participation in decision making, creating a just and safe working environment, feedback on task performance, encouraging heightened organizational communication, promote job enrichment and job rotation, induce employee independence, creating and enhancing effective hiring orientation and procedure, creating and maintaining an equitable distribution of incentives and other monetary benefits, establishing realistic, specific, and stimulating organizational goals, and encouraging timely feedback from employees, providing recreational centers.

On the other hand, Moylan et al. (2013), de Terte and Stephens (2014), Todt et al. (2018) also suggested several strategic options to manage employee stress on an individual level. These strategies may include; encouraging a healthy lifestyle, having plenty of water and controllable eating habits, take advantage of employee counseling in terms of career and personal development, taking regular sleep, creating a to-do list to manage time and schedules adequately, taking a walk during breaks, engage in watching comic videos and listening to similar audios, develop emotional intelligence, while being self-aware, self-controlled, self-confidence, and self-reliant. Individual employees are also encouraged to engage in regular physical exercise, avoid connection with negative people, and build social support.

Interestingly, Kohlbacher et al. (2011) have pointed out that employee stress tends to have a negative relationship with performance. They mostly submitted that employee performance is tied to employee stress. This submission implies that higher employee stress is likely to result in lower employee performance and lower employee stress could most likely result in higher employee performance. Although, experience has shown that even a little bit of stress on employees tends to inhibit the performance of employees across the board. This could pass a reality test because even relatively slight or considerably trivial stress on employees could hugely distract an employee (Todt et al., 2018). In a similar perspective, Marcellino et al. (2014) noted that employees who are under some form of stress are more likely to lose focus creative ability, and innovativeness, as they don't tend to think straight. They further stated that such employees are likely to concentrate on repulsive behaviours and negative emotions rather than concentrating on work. This demonstrates the propensity of a negative outcome on their performance level. Based on the different arguments on the composition of stressors and stress stimuli, as well as the outcome of a distress situation. It is pertinent to note that stress can spoil or increase employee performance depending on the skill composition or skill set of the employees that are directly involved in the stress situations. This shows that organizations that create and maintain an open system that encourages constant communication are likely to develop an environment in which employees are less likely to be or feed distress; this allows employees to put in their best in terms of skills and abilities in performing their task and responsibilities, thereby inducing higher possibility of having a work outcome that is in line with the plans and objectives of the organization.

The works reviewed above demonstrates that issues that surround employee personal demands have to be extensively addressed to influence some level of control, and induce social support towards reducing job stress on the employee (Garcia-Herrero et al., 2016). This means that employees will feel satisfied with their personal demands thereby putting in their best to tackle operational challenges that come with their jobs because they may most like feel motivated to do so (Giauque et al., 2013). Tay and Diener (2011) emphasize the need for organizations to achieve promoting the well-being of employees by attempting to address their personal demands as that would invariably address issues of emotional, family, and job demands of the employees.

**EMPIRICAL REVIEW**

S/N	Details of Study		Findings
i.	Author(s)/Year	Houdmont et al. (2019)	They found that the construct validity of a single-item measure of global job stressfulness appears to pivot around the referents of job demands and affect drawn from general experiences, as low stress jobs reported; "not at all stressful", mildly stressful, moderately stressful", while high stress jobs reported; "very stressful and extremely stressful".
	Country	United Kingdom	
	Topic	What does a single-item measure of job stressfulness assess?	
	Methodology	Sampling, interview, qualitative and quantitative approach.	
ii.	Author(s)/Year	Burman & Goswanis (2018)	Work stress not only affects the physical and psychological state, but also had an adverse effect on family and social life of the employee. Again, some of the major work stressors and coping strategies are what could be learnt and taught if organizations organizes workshops to create awareness about the impact of stress.
	Country	India	
	Topic	A Systematic literature review of work stress.	
	Methodology	Systematic literature Review	
iii.	Author(s)/Year	Panigrahi (2016)	Stress is an important factor as it helps in the achievement of stated objectives, but could have harmful effect if it surpasses a certain limit. At this point, stress could be highly harmful to the body, mind and reflected on the behavior of those who are involve with the stressors. This will have an adverse effect on organizational productivity and overall performance.
	Country	India	
	Topic	Managing stress of workplace	
	Methodology	Systematic literature review	
iv.	Author(s)/Year	Katic et al. (2019)	The findings indicate that risks arising from certain working styles and their relations to stress needs to be addressed if the organization intends to monitor, evaluate and manage stressors and stressful situations to enable employee perform better on all fronts.
	Country	Slovenia	
	Topic	The impact of stress of life, working, and management styles: How to make an organization healthier?	
	Methodology	Four divisional-questionnaire, qualitative approach	
v.	Author(s)/Year	Begum (2012)	Work-related dimensions (work hour and work place) have significant effect on sales people work-stress.
	Country	Indonesia	
	Topic	Effect of work-related dimensions on work-stress.	
	Methodology	Linear Regression and Pearson Moment C.orrelation.	
vi.	Author(s)/Year	Al-Mashaan (2001).	It was revealed that job stress and job satisfaction are closely relation to neuroticism, type a behavior, and locus of control and it exist among Kuwaiti personnel.
	Country	Kuwait	
	Topic	Job stress and job satisfaction and their relation to neuroticism, type a behavior, and locus of control among Kuwaiti personnel	
	Methodology	Quantitative method and Spearman's Rank Order C.orrelation Coefficient.	
vii.	Author(s)/Year	Cooper et al. (2001).	It was noted that organizational stress can be managed to achieve great outcome for both organization and the employee.
	Country	UK	
	Topic	Organizational stress: A review and critique of theory, research, and applications.	
	Methodology	Systematic literature review	

Source: Webometrics



## CONCLUSION

Employee stress is fast becoming a huge individual and work-life threatening factor with a negative effect on organizational performance and outcome as stressed individuals easily develop harmful behaviours such as withdrawal or sabotage just to cope with work-related stress. Workplace stressors can be physical or psychosocial. It culminates to several disturbing scenarios such as; non-availability of work materials, tools or equipment, noise, unconducive work environment such as poor lighting, poor office space, bullying or harassment etc. and excessive workloads, ambiguous performance expectations, less control over job-related decisions, fewer opportunities for growth and advancement, conflicting work demands etc. Hence, employees are expected to keep a to-do-list of all their activities in an attempt to identify and tract high stressors and how to adequately respond to them. Again, employees are advised to seek and get help from trusted colleagues, superiors, friends, and family in a bid to stressful situations. Nevertheless, employees are encouraged to develop a healthy lifestyle by eating right and engaging in any form of physical exercise that would help ease the stress, and taking time to relax, and recharge. Lastly, employees should work within their job description, and only exhibit organizational citizenship behaviour when it is absolutely necessary.

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# LEAF CONSUMPTION IN THE REARING OF SILKWORM WITH HIGH HUMIDITY METHOD

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## ABSTRACT

*In silkworm rearing in Uzbekistan, one of the main problems is the maintenance of a hygrothermal regime. Scientific research has been carried out to create optimal air temperature and relative humidity for rearing hybrid silkworms from the 1st instar to the 5th instar. In the experiments, the silkworms were fed in two different experiments and in the same comparative method. In silkworm rearing, the use of fabric and polyethylene film to retain humidity in a special device has been found to save mulberry leaf consumption by 15,3-18,7%, and to shorten the worm cycle by 2,7-4,0 days and due to maintaining the hygrothermal regime, a significant increase in silkworm growth and weight was observed.*

**KEYWORDS:** *silkworm, mulberry leaves, temperature, humidity, cocoon, silk.*

## INTRODUCTION

Silk is produced in more than 60 countries around the world, with the People's Republic of China accounting for the bulk of the cocoon's raw material. In the world silk market, the demand for cocoon products that produce silk fibers with a high metric number (fine) is growing year by year. The main demand of cocoon processing enterprises of the leading silk-producing countries is for silk yarns of types 3A, 4A, 5A. In the modern era of market relations, the production of competitive products in the world market of export-oriented products is of great priority. In the silk industry, best quality silk depends mainly on the quality and properties of the cocoon. Improving the quality of raw silk can be achieved through the application of new innovative technologies in the production of silk products using a variety of technologies.

In this regard, at present labour work is not accepted in the countries with developed sericulture, but the role of innovative technologies in the care of mulberry silkworms is of great importance. Therefore,

the use of innovative techniques and technologies in the period of mechanization and rearing of silkworms will facilitate the provision of quality raw materials in the production.

For preparing industrial seeds of silkworm, Sh.A.Sherbakov created a device to determine sex of cocoon based on their weight. B.A.Strunnikov proposed a method of obtaining breeding cocoons using the apparatus – Cocoon shell mass determiner, depending on the thickness of the cocoon shell obtained for breeding, and as a result it was proved that it is possible to increase the silkiness of cocoons [1].

While scientists in the field of sericulture have done a lot of research on shortening silkworm rearing period and producing abundant and quality cocoons, the advanced cocoon producers have also introduced a number of innovations into silkworm rearing processes in their practical experiments. As a result, several methods have been developed in silkworm rearing, such as simple method, intensive method and the method of silkworm breeding at changeable temperature, as well as an



improved method. Today, an improved intensive method is being used widely. For this, it is required the temperature to be 26-27°C and relative humidity to be 65-75% in the 1st, 2nd and 3rd instars of silkworm, in the 4th instar to be 25-26°C, in the 5th instar 24-25°C, while in cocooning stage 25°C, with humidity 60-65 percent [2]. In the result of rearing silkworm under this improved intensive rearing method, larva stage of reared silkworms reduced by 1-1,5 days, cocoon yield, mean weight of cocoon and silk-fiber yield increased by 4-5 percent.

The amount of the food given to the silkworm, eaten and digested by the worm body depends on the amount of water in the leaf, the moisture and freshness of the leaf. In cocoonery where the silkworms are reared, when the temperature is 25-27°C, the mulberry leaves lose freshness within 1,5 hours and get dried. Young larva of silkworm consume the leaves slower than the larva of older instar. In the rearing of young larva, the care under polyethylene film is much more effective. As a result of this, if the larva are fed at regular intervals, i.e 3 times a day with chopped leaves, the growth of worms is accelerated and the freshness of mulberry leaves remains more, getting less dried. The most part of the given feed, that is mulberry leaves are saved to be wasted. It was found that when a mulberry silkworm is fed in a simple way, 100-1200 kgs of leaves are consumed per box of worms, and when fed under film, an average of 750-800 kgs of food is consumed per box of worms [6].

When silkworms are reared under ordinary conditions, the moisture of the mulberry leaf quickly decreases and begins to dry out. By considering the worm's need for humidity, it has been suggested that young larva can be fed 4-5 times a day instead of 9-10 times a day if they are fed under a damp sheet/blanket cover or polyethylene film [2].

Mulberry silkworms need to be fed on special shelves to protect them from pests and floor (ground) moisture. Folding shelves and permanent stillages (racks) are used to rear the silkworm of all instars. They can be installed vertically in 2,3,4 and 8-10 layers [2].

In the method that is used in India, it is recommended to rear mulberry silkworm larvae in young and adult instars in special boxes measuring 2 × 3 m [5]. In the rearing process of the silkworm in these stillages the work can be accelerated and get easier. For feeding and thinning the silkworm larva, it has been noted that the time is saved by 23 percent to 60 percent. Furthermore, the damage that can be caused to larva reared in these stillages while changing their place, or transferring somewhere has been found to be decreased.

At the stage of cocooning of silkworm, the quality of cocoon, its calibre, i.e large or small sizes, shape, weight, shell mass, silkiness, cocoon hardness and technological indicators not only depend on silkworm breed, but also on cocooning condition too [2, 3, 4]. The authors reported that the temperature, humidity and light

in cocooning condition, as well as the amount and quality of mulberry leaves may affect considerably to cocooning.

The cost of growing mulberry silkworm and producing cocoon products is increasing. This is due to the fact that as a result of the decline in the quality of the cocoons grown, the fineness of the silk fiber is not at the level required by world standards. That is, non-recommended materials for silkworm rearing are used in the production process. It leads to defective formation of cocoons which are double, spotted and have a rack trace. The use of the proposed artificial trays of polyethylene, cardboard and other materials has been proven to improve the quality and technological performance of cocoons [7, 8].

## MATERIALS AND METHODS

The research was carried out in 2018-2020 in the ecological rearing facilities of the Uzbek Sericulture Research Institute. The experiments were performed on a Line 27 × Line 28 industrial hybrid of mulberry silkworm created at the institute. The experimental worms were fed with a mixture of mulberry leaves brought from the mulberry plantations of the "Jararik" experimental station. These special rearing facilities and mulberry leaves were used for second silkworm rearing, just like in the spring season. The special rearing bed with trays was made in the workshop of the laboratory "Mechanization of silkworm breeding" of the institute.

In the experiments on rearing hybrid silkworms under damp cloth and film, leaf consumption, air temperature, relative humidity, amount of consumed and wasted leaves, larva weight, cocoon weight, silkiness, capability for breeding and the most important technological indicators of cocoon were determined by variants according to the scheme of the experiment of the research carried out for three years.

Nowadays, in order to get a high cocoon yield from silkworms, it is necessary to use the agronomic techniques of silkworm feeding properly, along with rearing good industrial hybrids of silkworms. In our experiments, the silkworm larva were reared under the damp sheet (blanket) and polyethylene film in their I-V instars to prevent the silkworm food – mulberry leaves from drying out while bringing them, storing and feeding, as well as during their consumption. In our second experiment, the silkworms of young instars (I-III) were reared under damp sheet and film. For this, the humidity under the blanket and film is to be high (80-90%) and the temperature is low (22-24°C). As a result, the leaves retain moisture, do not dry up, and silkworms larva consume the leaf. To further increase the efficiency of feeding the larva under a blanket sheet and polyethylene film, we gave them mulberry leaves in different order. For example, they were fed 3, 4, 5 times a day and the results were recorded. During the experiment, the supply of more leaves of good quality to silkworms was achieved at their adult stage by saving mulberry leaves to be given to their younger instar stage.



Using this method, cocoon yield of good quality was obtained even during second silkworm rearing seasons. To do this, silkworms were fed as in the spring, and attention was paid to temperature and humidity. During the second rearing period, silkworms were fed with mulberry leaves mainly 4 times a day, and the results were recorded. It is noteworthy that when the silkworms of second rearing were fed in the laboratory, it was possible to obtain a cocoon yield of 50-55 kg per 1 box. The cocoon weight was also a bit heavier than the comparator.

## RESULTS AND DISCUSSION

The main purpose of our experiments to be conducted in high humidity condition was firstly, to retain longer the moisture of mulberry leaves, secondly, to reduce leaf consumption. For this, three experimental variants were made in a new type of rearing bed with trays: 1. Rearing silkworm under polyethylene film; 2. Rearing under blanket (sheet); 3. Rearing with simple method. In each variant, silkworm was reared by 800 pieces. During I-V-instars period, larva were fed 64 times with leaves. At the I-instar, they were fed 10 times; at the II-instar 10 times; at the III-instar 10 times; IV- 11

times; V-instar 23 times. The leaves were weighed before each feeding. During the experiments the weight of silkworms of III, IV, V-instars was determined and also the leaf consumption was recorded each time (Table 1).

Having analyzed the data presented in table-1 about a three-year research results on the method of rearing silkworms of new Line 27 × Line 28 industrial hybrid under damp blanket, we can see that leaf consumption by years didn't differ much from each other. This indicator made average 13294,8 g for 3 years. Mean temperature was 24,30C, humidity was 83,8 %. It is noteworthy that a high level of relative humidity was maintained in the experiments. While rearing silkworm in this method, the larva period made 26,0 days; 26,0; 28,5 days respectively by years. The average three-year larva period was 26,8 days. It should be emphasized that the number of leaf feeding the larva was 76,6 times during their I-V instars.

The next method of rearing silkworms in high humidity was to care for the worms under a film, which allowed us to cover the film tightly to our newly constructed rearing bed. The goal from this method was to minimize leaf moisture loss and create a microclimate for silkworms.

**Table 1**  
**Leaf consumption in rearing Line 27 × Line 28 hybrid silkworms under sheet cover**  
**(average indicators for 2018-2020)**

Silkworm instar	Number of feeding with leaves	Weight of 100 pcs of larva, g	Leaf consumption, g	Temperature °C	Relative humidity, %	Larva stage, day
I - instar	13		88,06	24,0	82,5	4,2
II - instar	11,3		294,0	24,4	83,0	4,7
III - instar	12	3,94 ±0,02	1 003,3	24,6	83,8	4,5
IV - instar	14	19,1 ±1,12	2 398,6	24,2	83,7	5,8
V - instar	26,3	96,02 ±0,26	9 484,1	24,2	81,8	7,7
Total	76,6		13 294,8	mean 24,3	mean 83,8	26,8

**Table 2**  
**Leaf consumption in rearing Line 27 × Line 28 hybrid silkworms under film cover**  
**(average indicators for 2018-2020)**

Silkworm instar	Number of feeding with leaves	Weight of 100 pcs of larva, g	Leaf consumption, g	Temperature °C	Relative humidity %	Larva stage, day
I - instar	12,7		112,8	26,0	55,9	4,2
II - instar	10,3		285,7	25,5	63,9	4,2
III - instar	11,3	3,91 ±0,06	925,7	25,3	64,6	4,3
IV - instar	13,3	24,26 ±1,54	2 116,3	25,4	76,0	5,2
V - instar	25,7	123,57 ±1,38	9 268,7	25,2	84,1	7,7
Total	68		12 709,0	25,5	80,9	25,5



It is clear from the figures given in table-2 that the use of film in the rearing beds allowed to retain humidity inside in high level. During the years 2018-2020, this indicator was equal to 70,4-86,6 %, was found to be average 80,9%.

As for the air temperature, this figure averaged 25,5°C. Most importantly, the temperature remained the same for three years. This allowed the silkworm to grow and develop normally.

Our observation of leaf consumption shows that silkworm rearing under the polyethylene film not only retains moisture, but also reduces leaf consumption. A three-year leaf consumption was 13219,0 g; 10534,5 g; 14374,4 g respectively, and average 12709,0 g, comparing to silkworm rearing method under damp blanket, 585,8 g less leaves were used.

Analysis of larva period indicate that during the three-year experiments the larva period of I-V- instars constituted 24,5-26,5 days, average 25,5 days.

The next method we used was a simple traditional silkworm rearing method (comparative), in which the worms are kept in the rearing bed not covered with something as usual. It should be noted that in different climatic conditions of our regions, it has been observed that the leaves for feeding silkworm quickly lose moisture, dry up and reduce feed efficiency, as well as over-consumed. Along with silkworm rearing methods under film and damp blanket sheets, we reared the worms in an open manner and determined leaf consumption, larva period, air temperature and humidity.

**Table 3**  
**Leaf consumption in rearing Line 27 × Line 28 hybrid silkworms under simple method (average indicators for 2018-2020)**

Silkworm instar	Number of feeding with leaves	Weight of 100 pcs of larva, g	Leaf consumption, g	Temperature, °C	Relative humidity, %	Larva stage, day
I - instar	32		139,2	25,9	73,9	4,8
II - instar	26,3		371,2	26,0	71,4	5,0
III - instar	30,7	3,52 ±0,28	1 290,5	26,0	70,2	4,8
IV - instar	25,7	16,83 ±1,63	2 508,0	26,3	71,4	6,8
V - instar	43,7	78,92 ±1,08	11 322,0	26,2	70,5	8,0
Total	158		15 630,8	25,9	70,8	29,5

From the analysis of the figures given in table 3, it can be seen that in this comparative method the leaf consumption increased significantly. It has also been observed that the number of feeding with leaves at the 5th instar was also very high, i.e, in 2018 mulberry leaves were given to silkworm total 166 times, in 2019 172 times and in 2020 136 times. During the three years leaf feeding was average 158 times. If we compare it with the methods of silkworm rearing under film and blanket, we can see that leaf feeding was done by 82-90 times more.

Leaf consumption results at the fifth instar of silkworms support these abovementioned comparisons. Because in 2018 the leaf consumption made 17333,2 g; in 2019 12352,7 g and in 2020 it was 17206,5 g, average 15630,8 g. When simple method was compared to the methods of silkworm rearing under the film and blanket, it led to overconsumption of additional 2336,0-2921,8 g or 2,3-2,9 kg leaves.

As for larva period of silkworm in simple method of rearing, it made 28,5 days in 2018; in 2019 29,5 days and in 2020 30,5 days. A three-year average indicator was 29,5 days. If it is compared to rearing under the film and cloth, larva period of silkworm was found to increase by 2,7-4,0 days. In its turn, it can lead to additional labor, leaves for feeding, and additional money for costs in sericulture.

## CONCLUSION

If we consider climatic conditions of Uzbekistan, a sharp change is noted in air temperature and humidity in silkworm rearing seasons. Under such conditions, it is required to create an optimal hygrothermal regime for silkworms in order to grow the maximum cocoon yield. Otherwise, it will not be possible to take full advantage of the genetic potential of industrial hybrids. In this research, mulberry silkworms were reared in three different methods, and the method of rearing silkworm under a damp cloth and polyethylene film was recommended for optimal silkworm rearing. The data obtained proved that the leaf needed to care for the silkworm could be significantly saved and the temperature and humidity could be kept at a level normal for silkworms by shortening the larva period.

The following conclusions can be drawn from our research for 2018-2020:

- mulberry leaf consumption can be saved by 15,3-18,7% when silkworms are reared under cloth and film;
- as a result of the use of cloth and polyethylene film to retain high humidity, the number of feedings the larva with leaves at 1-5 instars decreased by 81,4-90,0, and the larva period was reduced to 2,7-4,0 days;
- most importantly, as a result of rearing silkworms under the fabric and film, a significant increase in the



growth and weight of larva was observed due to the constant maintenance of the hygrothermal regime;

- in the conditions of Uzbekistan in silkworm-breeding farms, it is recommended to rear silkworms under cloth and polyethylene film.

## ACKNOWLEDGEMENTS

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# MOTION OF CHARGED PARTICLES IN A MAGNETIC FIELD

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## ANNOTATION

The article reveals the meaning of the movement of charged particles in a magnetic field. The movement of charged particles in a magnetic field should be studied in the topic "Magnetic field" when considering the effect of a magnet on a current. By this time, the following will be studied: circular motion, properties of electron beams, electric current in gases. The teacher can rely on the knowledge of these questions when studying a new topic and conduct a lesson in the form of a conversation.

**KEY WORDS AND CONCEPTS:** induction, current strength, speed, particle, motion.

## DISCUSSION

Based on the definition of the magnetic induction as a quantity measured by the force acting per unit length of the conductor with a current equal to unity, for the case when the field lines and the current are mutually perpendicular, we write:

$$B = \frac{F}{Il}$$

where B is expressed in tesla, F is in newtons, I is in amperes and l is in meters.

The force acting on a conductor with current is:

$$F = I l B.$$

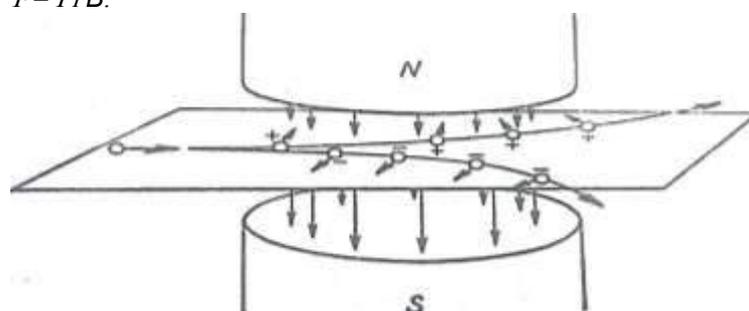
If one charged particle moves in a magnetic field, then the current generated by it is equal to:

$$I = \frac{e}{t}$$

and since  $l = vt$ , the force acting on a particle moving in a magnetic field (Lorentz force) is:

$$F_{\perp} = \frac{e}{t} vt B \sin a = e v B \sin a.$$

For the case when  $v \perp B$ , t, i.e. the particle moves in the direction perpendicular to the magnetic field lines:



**Figure: 1. The movement of charged particles in a magnetic field**

It is very important to show students that the Lorentz force is always perpendicular to the direction of the particle's velocity, i.e. that it is a centripetal force (Fig. 1).

This implies the fact that the trajectory of the particle is an arc of a circle, and the fact that the Lorentzian force changes the velocity of the particle only in direction, but not in magnitude, and,



therefore, does not produce work and does not change the energy of the particle.

We prove the perpendicularity of the Lorentz force to the speed using the left-hand rule to determine the direction of the force acting on a conductor with a current in a magnetic field.

Having established the fact that the Lorentz force is a centripetal force, we can write:

$$F_{\pi} = F_{u,c} = e v B = \frac{m v^a}{t}.$$

From the last equality, we obtain a formula for determining the radius of curvature of the particle trajectory:

$$r = \frac{m v}{B e}.$$

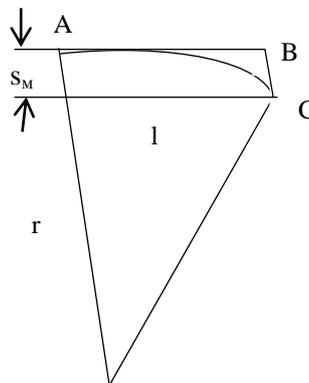
The smaller the radius of curvature of the trajectory, the greater the deflection of the particle in the magnetic field. Therefore, the analysis of the dependence of the magnitude of the deviation from the charge, mass and velocity of the particle can be carried out on the basis of the obtained formula or the formula for the centripetal force, but it is also possible to derive a formula for the magnitude of the deviation of a particle in a magnetic field.

Using the geometry theorem about the perpendicular dropped from any point of the circle to the diameter (Fig. 2), we have:

$$t^2 = 2r s_M.$$

or, substituting the value for r:

$$s_M = \frac{l^2 B e}{2 m v}.$$



**Figure: 2. To the determination of the non-magnitude of the deflection of an ion in a magnetic field**

We analyze the formula for various cases (electrons, protons and ions). We note that, while the deflection of a charged particle in an electric field is determined by the magnitude of its kinetic energy, its deflection in a magnetic field is determined by the magnitude of its momentum (momentum):

$$s_M = \frac{l^2 B e}{2 p}.$$

where  $p = mv$  is the momentum of the particle.

For the lesson in which the movement of particles in a magnetic field is studied, it is useful to repeat "The movement of particles in an electric field", and then conduct a survey in a comparative plan, finding out how and why the trajectories of movement in these fields differ, what are the reasons for the deviations of particles, how the magnitude

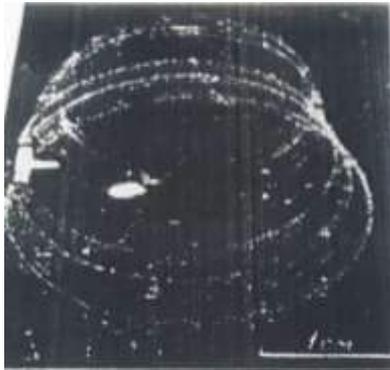
will change deviations in both cases with increasing speed.

Note that the dependence of the deviation of a particle on its mass and charge can be explained not only by a ready-made formula, but also by using the second law of dynamics.

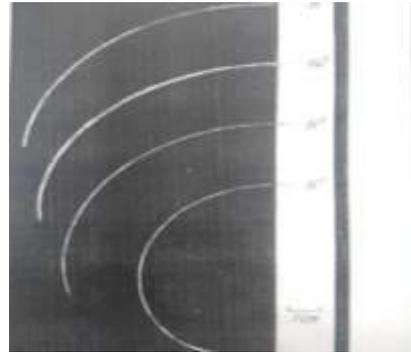
Examples of such an explanation:

A) Let an electron and a monovalent ion fly into the magnetic field with the same velocities, then  $e_1 = e_2$ ;  $v_1 = v_2$ ;  $m_1 < m_2$ . Since the Lorentz force does not depend on the mass of the particle, it will be the same for an electron and an ion, but on the basis of the second law of dynamics, the electron will receive a greater centripetal acceleration than an ion, and the radius of curvature of its trajectory will be less, and the magnitude of the deflection is greater.

B) Two ions having the same mass, but different degrees of ionization, fly into the magnetic field with the same speed ( $m_1 = m_2$ ;  $v_1 = v_2$ ;  $e_1 < e_2$ ;) )



**Figure A. Trajectory of motion of an electron in a magnetic field in the Wilson chamber.**



**Figure: B. Tracks of nuclei of light elements and magnetic field.**

In this case  $F_1 < F_2$ , and therefore  $r_1 > r_2$ ,  $\frac{r_1}{r_2} = \frac{e_2}{e_1}$ .

C) Two identical ions have different speeds, i.e.  $m_1 = m_2$ ;  $e_1 = e_2$ ;  $v_1 < v_2$ .

This case is interesting in that the Lorentz force depends on the magnitude of the velocity (this must be borne in mind when explaining), and therefore

$$\frac{r_1}{r_2} = \frac{v_1}{v_2}$$

General conclusions. The deflection of a charged particle in a magnetic field depends on its mass, charge, and speed. The deviation from the rectilinear path will be the greater, the greater the charge of the particles and the less its mass and velocity. By the deflection of a particle, one can judge the values of its mass, charge and speed.

The period of a complete revolution of a particle is calculated by the formula:

$$T = \frac{2\pi r}{v}$$

and, therefore, is equal to:

$$T = \frac{2\pi m v}{v B e} = \frac{2\pi m}{B e}$$

As you can see, the period of a particle's revolution does not depend on its velocity. This is due to the fact that with an increase in speed, the radius also increases, and hence the circumference, i.e. the path traveled by a particle increases in proportion to its speed.

If the particle moves with a speed comparable to the speed of light, then the increase in speed will increase the period, as the mass of the particle increases. It is imperative to dwell on the case of the relativistic motion of a particle, since this creates the preconditions for further study of the acceleration principle of high-energy particles.

The studied material acquires concreteness if it is accompanied by a demonstration of pictures of particle trajectories in a magnetic field. You can demonstrate the shape of the trajectory (incl. 1, Fig. A), the dependence of the radius of curvature on the kind of particle (incl. 1, Fig. B.), the change in the radius of curvature with the ability to speed due to deceleration (Fig. 3).



**Figure: 3. Trajectory of motion of an electron in a bubble chamber filled with a liquid waterfall.**

Students will be able to independently draw some of the simplest conclusions from the analysis of

particle trajectories: compare their velocities, masses, and determine the direction of motion.



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# AN ANALYSIS OF SOCIAL SECTOR EXPENDITURES AND PRIORITIES OF THE GOVERNMENT OF INDIAN IN THE POST REFORM PERIOD

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## ABSTRACT

*In this paper author has analyzed the social sector priorities of the Indian government over the period 1990-2010. The main focus in this paper is on the central government expenditures on social services. We have observed that the central government expenditure on the social sector is only one-fifth of total social sector expenditure in India, and 80% of the social services expenditure is incurred by the States over the period under study. The division of responsibilities between the centre and the states is laid down by the constitution. Health and most rural development issues are the responsibility of the states; education, welfare and employment issues come under the concurrent list-meaning that both the centre and the states are responsible. In practice, there is involvement of the centre in all social sectors. Activities that come under 'state' are sometimes directly or indirectly funded by the centre (as the States receive central assistance for their five-year plans as well as other financial support) and the centre has a considerable influence on policy directions in the states. This reflect the severe fiscal crisis many states are experiencing at present*

**KEYWORDS:** *Social Sector, Economic Reform, social sector expenditures, education and health expenditure*

## INTRODUCTION

The post reform period of Indian economy is special in economic as well as political terms. In 1991 there was an acute balance-of-payments crisis. The rupee was devalued, various international loans were taken to overcome the immediate problems, and a stabilization programme was introduced. This was followed by an adjustment programme. The result has been that the economic development model at the end of the 1990s was distinctly different from the development model pursued before 1991.

Indian economy has been passed through various phases of development. Just after the independence, we first focus on the development of industrial sector and give our little bit attention to agriculture sector in the form of land reforms. The dominant idea was that rural poverty and underdevelopment would decrease and disappear as a result of industrialization and, from the mid-1960s onwards, also as a result of agricultural growth.

By the end of the 1960s, a series of poverty studies was showing that rural poverty was still a very serious problem and that, so far, not much had been achieved. An increasing number of economists

became convinced that, though growth was important, it was not enough and that a 'direct attack' on poverty was also necessary (Vaidyanathan, 2001). This, together with political compulsions, made the then prime Minister Indira Gandhi introduces a number of specific anti-poverty schemes. The main focus of these schemes was on employment creation, through either wage employment or self-employment schemes. However, a shift occurred in the conceptualization of poverty and the prioritization of social policies. The focus shifted away from income and employment towards human development, a much broader concept, which also includes education, health, housing, rural roads, etc.

The government of India has proclaimed the new decade as a decade of development, during which India will meet bold targets for economic growth and social development. The starting point for the Decade of Development is the setting of development targets for India. One key target is the rise in national income, but targets should also include improvements in health and education, as well as political participation.

**OBJECTIVE**

- To study whether social sector expenditure declined/increased in the post reform period?
- To study What are the changes in the composition of social sector expenditures?
- To study Are there any improvement in education and health expenditure?
- To study What are the inter-state disparities in social sector expenditures?
- To study Has there been under utilization of expenditure in the social sector?
- Are the social sector expenditures in India low/high compared with other countries and international norms?

**METHODOLOGY**

The study is based exclusively on secondary data made available through different sources like: - RBI Hand Book on Statistics of Indian Economy, published by RBI, Special volume on public finance published by Centre for Monitoring Indian Economy (CMIE), Statistical information from INDIASTAT.com, Indian Public Finance Statistics 2004-05 & 2011-12 published by Ministry of Finance Department of Economic Affairs, Economic Division, Government of India.

The present study covers a period of 20 years i.e. from 1990-91 to 2010 -11. In the entire period of study we analysed the structural change and pattern of expenditure on social sector by the central and state governments. The fourteen major states have been taken in the study.

The simple statistical techniques and graphic methods like bar & pie diagrams are used where ever, it found necessary in the presentation of findings.

**PATTERN OF EXPENDITURE**

For knowing the priorities of Indian government for the targets set in last two decade of development we have analysed the expenditure pattern of the central government. The reason for analysing expenditure rather than allocation figures is that they give a better impression of the priorities. They are not so much based on good intentions, but are the concrete result of decisions and other social processes and compulsions. There are three ways of examining the social sector expenditures. The first is to look at social sector expenditure as a proportion of GDP, the second is to calculate it as a percentage of overall government expenditure, and the third option is to look as a percentage of developmental expenditures. We have used all the three method to analyse the patterns of social sector expenditure.

Table 1, gives an overview of social sector expenditure of the central government for the period 1990-91 to 2011-12. The picture that emerges from this table for social sector expenditure is slightly different. As a percentage of GDP, central government spends around 3% on the social sector. In 1990-91, the share of social sector expenditure of central government as percentage of GDP was 0.24 percent and reached to 2.071 percent in 2011-12. Throughout the 1990s, social sector expenditure, in terms of a percentage of GDP, was lower than that in the late 1980s. Social services expenditure of central government has increased tremendously in absolute terms from ₹ 32.74 billion in 1990-91 to ₹ 1249.90 billion in 2010-11. That was a 38 times increase in social services expenditure of central government.

**Table-1: Centre Governments Social Sector Expenditure as % of GDP  
Base year 2004-05 (Rupees in billions)**

Year	GDP at Factor Cost	Social Services	Social Sector Expenditure as % of GDP
1990-91	13478.89	32.74	0.24289834
1991-92	13671.71	35.69	0.261050008
1992-93	14405.03	40.09	0.278305564
1993-94	15223.43	48.30	0.317274097
1994-95	16196.94	58.73	0.362599355
1995-96	17377.40	76.55	0.440514691
1996-97	18763.19	96.72	0.515477379
1997-98	19570.31	118.45	0.60525357
1998-99	20878.27	146.56	0.70197387
1999-00	22462.76	172.21	0.766646663
2000-01	23427.74	176.79	0.754618243
2001-02	24720.52	151.30	0.612042142
2002-03	25706.90	220.07	0.856073661
2003-04	27778.13	238.59	0.858913109



2004-05	29714.64	299.06	1.006439923
2005-06	32530.73	382.64	1.176241664
2006-07	35643.64	437.62	1.227764617
2007-08	38966.36	616.48	1.582082596
2008-09	41586.76	897.97	2.15926896
2009-10	45076.37	1026.28	2.27675831
2010-11	48859.54	1249.90	2.55814934
2011-12	52025.14	1077.56	2.071229409

Source: Computed on the basis of data taken from RBI, Handbook of Statistics on Indian Economy, 2011-12.

On the basis of Table 2, different arguments can be made. Advocates of the reforms can claim that they are proved right when they say that the reforms are meant to reduce state intervention in certain sectors in order to increase expenditure on the social sector. After all, after the mid-1990s, there has been an increase in social sector expenditure taken as a percentage of overall government expenditure. Opponents of the reforms, on the other hand, can claim that the social sector has suffered because, as a percentage of GDP, social sector expenditure in the 1990s was less than it was in the late 1980s.

In 1990-91 the total expenditure (Revenue expenditure + capital expenditure) of the central government was ₹ 1052.98 billion and reached to ₹ 13187.20 billion in 2011-12. It shows a 13 times increase in the total expenditure of central government. Social services expenditure of central government as percentage of total expenditure was 3.109 percent in 1990-91 and witnessed a remarkable increase up to 10.5 percent in 2010-11. This increase in social services expenditure of central government is noticeable after 2002-03.

**Table-2: Central Governments Social Sector Expenditure as % of Total Expenditure (Rev. + Cap.)**

Year	Total expenditure(Rev + Cap)	Social services	Social Services As % of Total Exp(Rev + Cap)
1990-91	1052.98	32.74	3.109270831
1991-92	1114.14	35.69	3.20336762
1992-93	1226.18	40.09	3.269503662
1993-94	1418.53	48.30	3.404933276
1994-95	1607.39	58.73	3.653749246
1995-96	1782.75	76.55	4.29392792
1996-97	2010.07	96.72	4.811772724
1997-98	2320.53	118.45	5.104437348
1998-99	2793.40	146.56	5.246652825
1999-00	2980.53	172.21	5.77783146
2000-01	3255.92	176.79	5.429801715
2001-02	3623.10	151.30	4.175981894
2002-03	4132.48	220.07	5.325373626
2003-04	4712.03	238.59	5.063422771
2004-05	4982.52	299.06	6.002183634
2005-06	5057.38	382.64	7.565972895
2006-07	5833.87	437.62	7.501367017
2007-08	7126.71	616.48	8.650274811
2008-09	8839.56	897.97	10.1585373
2009-10	10244.87	1026.28	10.01750144
2010-11	11973.28	1249.90	10.43907768
2011-12	13187.20	1077.56	8.171256976

Source: Computed on the basis of data taken from RBI, Handbook of Statistics on Indian Economy, 2011-12.

Table 3, gives an overview of social services expenditures of central government as percentage of developmental expenditure for the post reform period i.e. from 1990-91 to 2010-11. The share of social services as percentage of developmental expenditure in 1990-91 was 18.61 percent and reached to its highest 29.31 percent in 1998-99. But after that it

started to decline and reached to its minimum level 22.27 percent in 2006-07. We can see from the Table 3 and bar diagram, that this was full of fluctuations. The social services expenditure of central government reached to ₹ 141932.59 crores in 2010-11 from ₹ 6431.62 crores in 1990-91. The



expenditure on social services witnessed only 22 times increase in the post reform period.

**Table-3: Central Government Social Sector Expenditure as % of Developmental Expenditure**

Year	Developmental Expenditure	Social & Community services	Social & Community services As % of developmental Exp.
1990-91	34565.79	6431.62	18.61
1995-96	47761.08	11835.44	24.78
1996-97	52925.02	14225.23	26.88
1997-98	62409.92	16957.48	27.17
1998-99	72141.76	21146.08	29.31
1999-2000	84543.85	22887.26	27.07
2000-01	91884.1	25142.73	27.36
2001-02	101531.07	22479.35	22.14
2002-03	117971.51	27671.89	23.46
2003-04	134483.76	30481.48	22.67
2004-05	143010.08	37719.81	26.38
2005-06	174951.89	46705.92	26.70
2006-05	219086.51	54907.44	25.06
2006-07	304293.37	67757.34	22.27
2007-08	383107.08	90386.24	23.59
2008-09	413851.75	105314.26	25.45
2009-10	543399.83	124829.79	22.97
2010-11(RE)	548496.28	141932.59	25.88

Source: Computed on the basis of data taken from RBI, Handbook of Statistics on Indian Economy, 2011-12.

**Figure-1**

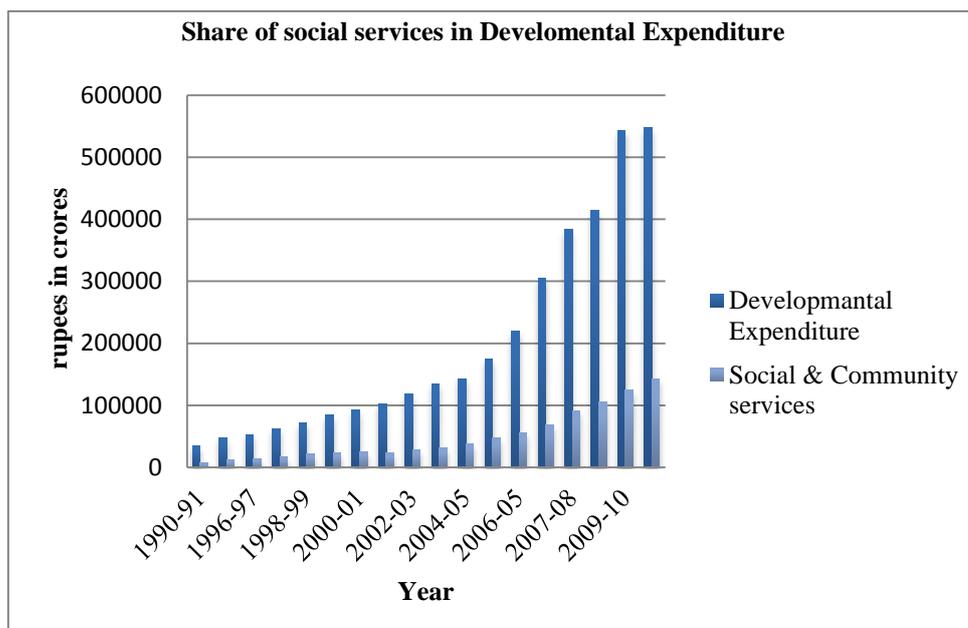


Table 4, gives an overview of the expenditure of central government on major heads of social services as percentage of total social sector expenditure. We can see that central government used to spend 31.53 percent of total social sector

expenditure on education in 190-91 and reached 31.67 percent in 2010-11. This increase for education sector is negligible. Social service expenditure on health sector is almost constant and having no change throughout the study period. The



most striking change can be witnessed in rural development expenditure.

The expenditure on rural development as percentage of total social services expenditure of central government was 7.4 percent in 1990-91. It increased for the first five years of the reform period, and then started to decline significantly from 1995-96, though in 1995-96 rural development expenditure reached to its maximum at 33.45 percent of total social sector expenditure. In 1996-97 the Basic Minimum Services (BMS) programme was introduced. One might hypothesise that the funds for BMS came partly from the rural

development outlay, although this was denied by the government at the time.

It is important to note, however, that the two (rural development and BMS) are not the same. Rural development expenditure goes mainly to employment schemes. BMS includes other minimum services, which may, or may not, take place in rural areas. The expenditure on scientific services and research has experienced a decline from 18.98 percent in 1990-91 to 10.93 percent in 2010-11. All other also have mixed fluctuation during the reform period.

**TableNo.4: Expenditure on Social and Community Services as Percentage total Social Sector Expenditure**

	Education, art & culture	Scientific services & research	Medical, public health, sanitation & water supply	Family welfare	Housing	Urban development	Broadcasting	Labour & employment	Social security & welfare(P)	Information & publicity	Rural development	Others
1990-91	31.53	18.98	10.57	11.31	3.82	1.64	8.76	4.32	1.31	0.13	7.4	0.21
1995-96	21.29	12.35	8.39	8.63	4.37	0.26	4.87	2.87	2.32	0.13	33.45	1.06
1996-97	21.67	13.22	8.52	8.21	8.54	0.57	5.42	3.08	3.73	0.15	25.87	1.01
1997-98	23.50	13.27	8.98	8.20	8.78	0.56	5.44	2.69	4.30	0.14	23.62	0.53
1998-99	26.52	12.60	9.29	8.80	9.15	0.72	4.81	2.84	3.75	0.12	20.20	1.19
1999-2000	28.67	13.20	9.83	10.97	9.23	0.69	5.13	3.02	-0.46	0.09	18.88	0.73
2000-01	29.33	13.84	10.57	10.43	8.66	0.90	3.28	2.98	4.07	0.09	15.54	0.31
2001-02	31.18	16.89	11.86	12.32	10.43	1.00	-11.50	2.96	2.21	0.07	22.15	0.43
2002-03	25.72	13.56	9.39	10.07	7.53	0.79	2.46	1.97	-1.98	0.04	30.05	0.40
2003-04	26.25	13.77	9.93	10.34	7.70	1.15	2.36	1.96	-2.63	0.04	28.88	0.27
2004-05	30.30	15.51	11.03	10.22	9.31	0.65	2.15	2.13	-2.24	0.04	20.45	0.44
2005-06	30.57	12.81	9.97	9.20	6.28	0.63	1.76	2.02	0.92	0.05	25.59	0.22
2005-06	34.43	12.09	9.75	8.53	5.57	0.62	1.56	2.59	-0.80	0.04	25.40	0.22
2006-07	31.75	10.99	9.60	9.93	6.05	1.12	1.21	2.12	0.94	0.04	26.00	0.25
2007-08	28.11	9.27	8.13	7.61	8.22	1.19	0.90	1.68	0.83	0.07	33.78	0.19
2008-09	29.04	10.37	11.25	8.07	7.35	1.64	1.00	1.52	0.78	0.07	28.64	0.26
2009-10	30.61	9.86	11.38	6.91	6.48	1.27	0.94	1.66	1.42	0.08	29.11	0.29
2010-11(RE)	31.67	10.83	11.70	7.72	5.99	1.16	0.84	1.54	1.54	0.08	26.61	0.31

Source : Computed on the basis of data taken from Indian Public Finance 2010-11, Published by Ministry of Finance.



Table 5, provides central government allocations for education in the post-reform period. It shows that the nineties have witnessed significant shifts. Education sector has largest share in social sector expenditures. This share increased to about 34.43 per cent in 2005-06 from 31.54 percent in 1990-01. Since 1995-96, however, the share had declined and it was 23.50

percent in 1997-98. Some eminent study show that the shift in favour of education was due to the introduction of nutrition programmes and District Primary Education Programme (DPEP).

**Table 5: Expenditure on Education as % of Developmental and Social & Community Services**  
Rs. in crore

Year	Developmental Expenditure	Social & Community services	Expenditure on Education, art & culture	Education, art & culture as % of developmental expenditure	Education, art & culture as % of Social & Community services
1990-91	34565.79	6431.62	2190.57	6.34	34.06
1995-96	47761.08	11835.44	3786.36	7.93	31.99
1996-97	52925.02	14225.23	4158.98	7.86	29.24
1997-98	62409.92	16957.48	5216.58	8.36	30.76
1998-99	72141.76	21146.08	7027.33	9.74	33.23
1999-2000	84543.85	22887.26	8090.8	9.57	35.35
2000-01	91884.1	25142.73	8730.15	9.50	34.72
2001-02	101531.07	22479.35	9002.95	8.87	40.05
2002-03	117971.51	27671.89	10177.01	8.63	36.78
2003-04	134483.76	30481.48	11248.66	8.36	36.90
2004-05	143010.08	37719.81	14368.87	10.05	38.09
2005-06	174951.89	46705.92	19185.86	10.97	41.08
2006-05	219086.51	54907.44	25340.31	11.57	46.15
2006-07	304293.37	67757.34	29072.37	9.55	42.91
2007-08	383107.08	90386.24	38375.18	10.02	42.46
2008-09	413851.75	105314.26	42861.89	10.36	40.70
2009-10	543399.83	124829.79	53899.88	9.92	43.18
2010-11(RE)	548496.28	141932.59	61241.1	11.17	43.15

Source : Computed on the basis of data taken from Indian Public Finance 2010-11, Published by Ministry of Finance.

The intra-allocation for health and family welfare (Table 6) show that there was no increase in the share of health sector till the end of 1990s. It was from 2000 when health sector witness any kind of growth in expenditure that from 11 percent to 15 percent in 1990-1991 & 2000-01 respectively.

**Table 6: Expenditure on Medical, Public Health, Sanitation & Water Supply % of Developmental and Social & Community Services.**

Year	Developmental Expenditure	Social & Community Services	Medical, public health, sanitation & water supply	Rs. in crore	
				Medical, public health, sanitation & water supply as % of developmental Exp	Medical, public health, sanitation & water supply as % of Social & Community Exp
1990-91	34565.79	6431.62	734.04	2.12	11.41
1995-96	47761.08	11835.44	1492.69	3.13	12.61
1996-97	52925.02	14225.23	1634.94	3.09	11.49
1997-98	62409.92	16957.48	1992.98	3.19	11.75
1998-99	72141.76	21146.08	2462.52	3.41	11.65
1999-2000	84543.85	22887.26	2774.35	3.28	12.12
2000-01	91884.1	25142.73	3146.83	3.42	12.52
2001-02	101531.07	22479.35	3423.78	3.37	15.23
2002-03	117971.51	27671.89	3715.66	3.15	13.43
2003-04	134483.76	30481.48	4254.33	3.16	13.96
2004-05	143010.08	37719.81	5229.84	3.66	13.86
2005-06	174951.89	46705.92	6257.1	3.58	13.40
2006-05	219086.51	54907.44	7176.81	3.28	13.07
2006-07	304293.37	67757.34	8790.45	2.89	12.97
2007-08	383107.08	90386.24	11103.1	2.90	12.28
2008-09	413851.75	105314.26	16596.59	4.01	15.76
2009-10	543399.83	124829.79	20029.99	3.69	16.05
2010-11(RE)	548496.28	141932.59	22624.9	4.12	15.94

Source : Computed on the basis of data taken from Indian Public Finance 2010-11, Published by Ministry of Finance.

In the case of rural development (Table 7), the share of rural wage employment programmes declined drastically since mid-1990s. In 2002-03, however, the share has increased again. The share for rural housing and

other programmes increased in the 1990s as a result of the introduction of the rural roads scheme, known as the Prime Minister's Gram Samrudhi Yojana (PMGSY).

**Table 7: Expenditure on Rural Development as % of Developmental and Social & Community Services**

Year	Developmental Expenditure	Social & Community services	Rural development expenditure	Rs. in crore	
				Rural development expenditure As % of Developmental Expenditure	Rural development expenditure As % of Social & community services
1990-91	34565.79	6431.62	515.63	1.49	8.02
1995-96	47761.08	11835.44	5947.7	12.45	50.25
1996-97	52925.02	14225.23	4965.34	9.38	34.91
1997-98	62409.92	16957.48	5244.41	8.40	30.93
1998-99	72141.76	21146.08	5354.13	7.42	25.32
1999-2000	84543.85	22887.26	5328.49	6.30	23.28
2000-01	91884.1	25142.73	4626.84	5.04	18.40
2001-02	101531.07	22479.35	6395.2	6.30	28.45
2002-03	117971.51	27671.89	11889.46	10.08	42.97
2003-04	134483.76	30481.48	12377.78	9.20	40.61
2004-05	143010.08	37719.81	9698.99	6.78	25.71
2005-06	174951.89	46705.92	16063.77	9.18	34.39
2006-05	219086.51	54907.44	18691.79	8.53	34.04
2006-07	304293.37	67757.34	23811.64	7.83	35.14
2007-08	383107.08	90386.24	46114.36	12.04	51.02
2008-09	413851.75	105314.26	42258.72	10.21	40.13
2009-10	543399.83	124829.79	51255.43	9.43	41.06
2010-11(RE)	548496.28	141932.59	51462.24	9.38	36.26

Source : Computed on the basis of data taken from Indian Public Finance 2010-11, Published by Ministry of Finance.

## CONCLUSION

Observations made are all, as percentages of GDP and aggregate government expenditure, the picture is mixed. The question that immediately arises is whether the expenditure levels should be considered high or low. The answer to this question depends on the yardstick. Author used different kinds of yardsticks and concluded that the expenditure on the social sector is low. Second, there has been a significant shift, starting from 1996-97 and visible at the centre, away from rural development. This does not necessarily mean a shift away from rural to urban, but a shift from (mainly) wage employment schemes to the basic minimum needs kind of programmes. Within the rural development outlay at the centre, there is a shift away from rural employment schemes to rural housing, water, rural roads, etc. In other words, there is a shift from the traditional ways of addressing rural poverty to what we can call

human development or basic needs interventions. A relevant question is, of course, whether this shift is the result of relabeling and reclassification of schemes or whether it reflects a real change. To some extent, indeed, relabeling is a reason behind the shift, but this does not explain the shift completely, and this renaming and reclassification itself illustrates a shift in thinking in what is considered to be the most important characteristic of a particular scheme

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# **SINGLEHOOD STIGMATIZATION: EXPERIENCE OF SINGLE WOMEN IN RIVERS STATE**

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## **ABSTRACT**

*This study investigated on the experience of stigmatization from the perspective of single women in Rivers State. The study adopted the ex-post facto research design using a population of 150 single women drawn using convenience and snowballing techniques. Data from the study was obtained using a structured questionnaire constructed on a four-point Likert Scale. The questionnaire was assessed for validity and reliability and was shown to be suitable as a data collection tool for the study. Mean, standard deviation and rank order were used to answer the research question, while the hypotheses were tested using independent samples t-test. Result from the study showed that major forms of stigmatization experienced by single women were loss of friends and social network, insult and name calling, disrespect by family members and discrimination in employment. The result further showed that older single women experience a significantly higher level of stigmatization than younger single women, less educated single women experience a significantly higher level of stigmatization than highly educated women, and never-married single women experience a significantly higher level of stigmatization than previously married single women. On the basis of these findings, it was recommended that women support groups should be formed which provide legal and policy backings to any single woman who feel stigmatized and discriminated against.*

**KEYWORDS:** *Singlehood, women, stigmatization, discrimination.*

## **INTRODUCTION**

Marriage has been a staple feature in almost all societies. This is because, beyond the cultural relevance, marriage is a strategy through which society sustains itself. However, as society grows it has become inevitable that more people will remain single. Presently, the number of people that have remained single continues to increase, especially with advances in technology, science and greater job mobility. The question remains is singlehood a state of stigmatization or one of admiration

To appropriately answer this question, it is pertinent to define what we mean by singlehood as well as identify the definition of stigmatization. Within the

context of this study, the forms and incidences of stigmatization against single people in Rivers State were considered. In Rivers State, marriage is often celebrated and individuals who are married are seen as the bastion of societal progress. Therefore, few observers would question that the cultural images, public policies and personal attitudes elevate the status of being married relative to singlehood in River State. It is against this background that DePaulo and Morris (2005) argued that stigmatization against singlehood is pervasive, yet passive, and largely uncontested which has resulted in a new phenomenon called “singlism” or prejudice and discrimination targeted against the unmarried. Society often confers privileges,



opportunities and prospects to married individuals than to single individuals.

Commenting further, Ntoimo and Isiugo-Abanihe (2014) argued that many cultures in Nigeria hold the assumption that all young adults should marry except for religious reasons. However, modern trends, have necessitated an increase in the number of married as well as unmarried people beyond the age approved in many African societies. Citing the National Population Commission report of 1999, Ntoimo and Isiugo-Abanihe (2014) stated that there has been an increase in the number of people above 30 years that has never married. In 1999, it was 3.4% while in 2006 it increased to 6.7%. This increase in the number of unmarried people has not changed society perception on singlehood much. Rather there has been an increase in the pressure and the need for people to initial and sustain heterosexual marital relationships. While it might be agreed that stigma and disapproval against singlehood affect both genders it is often worse for female. Men who are single above a certain age may be spotlighted and experience some form of stigma, but the majority of the disapproval, stigmatization and condemnation for singlehood is often experienced by females (Byrne & Carr, 2005).

Stigma against singlehood is often met with adverse consequences. Research has shown that stigma affects the physical and mental health, psychological well-being as well as results in institutional barriers for personal professional progress. Furthermore, stigma results in stress and act as discouragement from taking up opportunities and achieving life goals. Given this negative consequences of stigma, it is important and urgent for us to understand how single people, especially females experience stigmatization in Rivers State but first of all, it is pertinent for us to understand what the concept of stigma is as well as operationalize it within the context of this study

## CONCEPT OF STIGMA IN SINGLEHOOD

As a social construct, the concept of singlehood and stigmatization has had fairly broad definitions. While being single might be considered straightforward, its definition has brought significant scholarly debates and arguments. For this research, a single person is defined as an individual who is not currently involved in a close relationship or in any marital relationship whether they have been partnered or married in the past as defined by Conley and Collins (2002).

One of the earliest definitions of stigmatization was provided by Goffman (1963), in which he defined stigma as any personal attribute that is discrediting to

its possessor and that reduces such a person from a whole usual person to a tainted and discounted person. Similarly, Crocker, Major, and Steele (1998) defined stigma as a social identity that is devalued in a particular context. These definitions conceptualize stigma in terms of social desirability and acceptance. More recent definitions of stigma which have shown the immense application to the study of singlehood have characterized it from a normative perspective. For example, Stafford and Scott (1996), described stigma as a characteristic that is contrary to the norm of a social unit. A norm in this context refers to a shared belief which determines what to behave in a specific way at a specific time considering this definition singlehood is considered a violation of societal norms in that at a specific age this individual ought to have been married. Furthermore, they are considered has been responsible for their solitary civil status due to some character flaws such as immaturity self-centeredness and lack of personal discipline (Morris, Sinclair, & DePaulo, 2007).

The way and manner in which single people experience stigmatization have been a source of debate. Link and Phelan (2001) proposed that singlehood is not uniform across all types of unmarried people. For example, they mentioned people who are single from birth, those who are single from divorce and separation, and those who are single because they are prevented from marrying those they wish to marry. Considering this distinction, it was further proposed that the experience of stigmatization is likely to be varied based on the nature of singlehood an individual is associated with. Using this perspective they gave further insight into the different components that must exist for a stigma to occur. These are labelling, stereotyping, status loss and discrimination. In their conceptualization of the stigma process, a labelled person experiences discrimination and status loss, which, in turn, may have harmful consequences for their life chances, including their psychological, economic, and physical well-being.

## PREVIOUS STUDIES ON STIGMATIZATION OF SINGLEHOOD

Research into discrimination of single individuals has continued to take a primary place in modern psychosocial studies. Evidence from developed countries such as the United States Germany China and recently in developing countries like Nigeria and South Africa, has shown that single individuals experience a higher level of discrimination than those who are married. A few of these studies are reviewed below to provide further context for the current research.



Using data from the United States Midlife Development Survey, Bryne and Carr (2005), found that never-married single persons are much more likely to report discriminatory treatment than their married pair. The result showed that single men reported a higher level of maltreatment than their married counterparts. This treatment includes harassment, threats and speech degradation. On the other hand, single women reported that they are being treated with less respect receive less and poorer service and have been called names more than their married counterparts. The conclusion from this study is that single people experience a higher level of intrapersonal and institutional discrimination those who are married.

Using a semi-structured interview, Macvarish (2006), investigated the discrimination experienced by women in London and south-east of Great Britain. The sample for the studying was made up of 15 women who were recruited using a snowball method. The result from the study showed that women reported being called "spinster" which is seen as a failure and poor achievement in the public. This was despite the fact that Great Britain had the lowest ranking of stigmatization among the countries in Western Europe. In China, older single women reported a low level of social acceptance and support compared to their peers who were married. The term used to describe such women is "*shengnu*" which literally means "leftover women". Furthermore, these women experience a high level of pressure from their government and parents to get married as reported by Gaetano (2010).

In a well-detailed series of studies conducted by Greitemeyer (2009), among women in Germany, it was revealed that both self and other ratings of single and partnered subjects yielded a more negative evaluation of single persons in a wide range of personality characteristics well-being and relationship status. The study further showed that individuals in a relationship reported a higher level of satisfaction in their relationship status than those who were single. These results are further confirmation that individuals who are single experience a higher level of personal dissatisfaction as well as a higher level of discrimination compared to those who are in a marital or heterosexual relationship. Research by Kalmijn, vanGroenou, and Fine (2005) showed that being single from divorce leads to a decrease in social segregation and a heightened level of stigmatization and discrimination. In another study by Toukhoushian (1998), it was revealed that single men receive lower salaries than their married counterparts and are less likely to get promotion even after controlling for the effect of performance and seniority. The findings of this study showed that single individuals, both male

and females experience a significantly higher level of individual, social and intrapersonal level of discrimination than tools in marital relationships.

Closely related to the current study was the research by Ntoimo and Isiugo-Abanihe (2014) who interviewed 25 women and also collected data from life histories and seven focus group. The women were 30 years and above and we never married. The results showed that respondent experience various forms of stigma such as name-calling, denigration of their marital status, suspicion, disrespect, difficulty in renting residential apartment amongst others. The major conclusion from the study is that while male and female might experience stigmatization from being single, women experienced a higher level of stigmatization Thus, highlighting the persistent gender equality in Nigeria.

An observation of the above studies confirmed the fact that being single is a challenge for many individuals, male and female alike. However, for most females especially due to gender inequality in Nigeria and Rivers State specifically the experience of gender inequality, singlehood discrimination and stigmatization is yet to receive the empirical attention it requires. While the above studies have shown the challenges of singlehood, no study has been conducted in Rivers State investigating the forms and incidence of singlehood experience by single women. It was to cover this gap in the literature that informed the conduct of the present study which seeks to investigate the forms and incidents of stigmatization experienced by single women in Rivers State Nigeria.

## **PURPOSE OF THE STUDY**

The purpose of the current study is to investigate the experience of single women in regards to the stigmatization they experience due to their marital status. In specific terms, the following were the aims of the study:

1. To ascertain the extent to which age influences the experience of stigma among single women in Rivers State.
2. To investigate the extent to which educational qualification influences the experience of single women in Rivers State.
3. To verify the extent to which separated and never-married women experience stigmatization in Rivers State.

## **RESEARCH QUESTION**

The following research question was further developed to also guide the study:



1. What is the experience of single women with regards to stigmatization in Rivers State, Nigeria?

### HYPOTHESES

The following null hypotheses were further used to guide the study and were tested at 0.05 level of significance

1. There is no significant difference between the stigmatization experience of younger women and older single women in Rivers State.
2. There is no significant difference in the experience of stigmatization among single women in Rivers State based on their educational qualification?
3. There is no significant difference in the experience of stigma of separated and never-married single women in Rivers State.

### METHODOLOGY

This study adopted the expost-facto survey design. Using convenience and snowballing techniques, 150 women were selected for this study from Obio-Akpor and Port Harcourt City Local Government Areas of Rivers State. An instrument titled "Experience of Stigmatization among Single Women Inventory (ESSWI) which was developed by the researchers was

used for data collection. The ESSWI was developed using a self-report rating scale format of Regularly (RE), Sometimes (ST), Rarely (RA) and Never (NV) which were scored as 4, 3, 2, and 1 points respectively. The ESSWI had 9 items and was adapted based on the items utilized by Ntoimo and Isiugo-Abanihe (2014). The questionnaire also had a section for respondents to report some demographic characteristics such as religion, age, educational status and singlehood status. The ESSWI was validated by experts in Counselling Psychology, Measurement and Evaluation for face and content validities. After the initial validation process, the instrument was subjected to reliability analysis using the Cronbach Alpha method. For conducting the reliability, the instrument was administered on 15 single women in Ikwerre Local Government Area of Rivers State, which were not part of the sampled groups. Further analysis showed that the instrument had an alpha coefficient of 0.81 which suggest that the instrument possessed suitable level of reliability. Mean, standard deviation and rank order were used to answer the research questions based on the data collected, while independent samples t-test was used to test the associated hypotheses at 0.05 level of significance. A criterion mean of 2.5 was used to select the stigmatization experience of the women.

### RESULTS

**Table 1: Demographic Characteristics of Respondents**

Variables	N	Percentage
<b>Religion</b>		
Christianity	139	93
Others	11	7
<b>Age</b>		
30-40	106	71
40 and Above	44	29
<b>Singlehood Status</b>		
Never Married	98	65
Separated/Divorce	32	21
Widowed	20	14
<b>Highest Education Qualification</b>		
Primary/Secondary	27	18
OND/HND/Bachelors	108	72
Graduate Degrees	15	10

From the Table shown in Table 1 above, it can be seen that 93% (n = 139) of the respondents were Christian, while 7% (n = 11) identified as being in from religions. Regarding age, 106 representing 71% were between 30 and 40 years, with 44 (29%) reporting that they were between above 40 years. On their singlehood status, 65% (n = 98) had never been married, 21% (n =

32) reported that they were divorced/separated, while 20% (n = 14) indicated that they are widowed. Finally, the table showed that about 82% (n = 82) of the respondents had some forms of tertiary education, with only 18% (n = 18) reporting both primary and secondary education as their highest educational qualification.

**ANALYSIS OF RESEARCH QUESTIONS AND HYPOTHESES****Table 2: Single women Experience of Stigmatization**

S/N	Kindly specify the extent to which you experience the various forms of discrimination.	Mean	SD	Rank
1.	Suspicion	2.91	0.92	5 <sup>th</sup>
2.	Insult and Name calling	3.05	0.82	2 <sup>nd</sup>
3.	Disrespect by family members	2.95	0.67	3 <sup>rd</sup>
4.	Loss of friends/network	3.17	0.71	1 <sup>st</sup>
5.	Public shame and embarrassment	2.65	0.74	7 <sup>th</sup>
6.	Threat and Violence	2.23	0.71	9 <sup>th</sup>
7.	Difficulty in renting an apartment	2.88	0.85	6 <sup>th</sup>
8.	Cheating and duping by prospective spouse	2.41	0.75	8 <sup>th</sup>
9.	Discrimination in employment/business	2.94	0.69	4 <sup>th</sup>

From the result shown Table 2 above, the extent to which single women experience various forms of stigmatization was reported. According to the result obtained after the analysis of data, the highest place single women experience stigmatization was in the loss of friends (mean = 3.17, SD = 0.71), followed by insult and name calling (mean = 3.05, SD = 0.82), disrespect by family members (mean = 2.95, SD = 0.67), discrimination in employment/business (mean = 2.94, SD = 0.69), suspicion (mean = 2.91, SD = 0.92),

difficulty in renting an apartment (mean = 2.88, SD = 0.85), public shame and embarrassment (mean = 2.65, SD = 0.74). On the other hand, it was not agreed that cheating and duping by prospective spouse (mean = 2.41, SD = 0.75), as well as threat and violence (mean = 2.23, SD = 0.71) were significant stigmatization experienced by single women in Rivers State. Based on this result, the aspect of stigmatization experienced by single women was in the loss of friends/social network, while the least was on threat and violence.

**Table 3: Independent samples t-test of stigmatization experience of women based on their age**

Age	N	Mean	SD	DF	t	p	Decision
30-40	106	2.64	0.69	148	2.23	0.025	Reject H <sub>01</sub>
Above 40	44	2.96	0.83				P<0.005

From the result presented in Table 3, it is revealed that single women between the ages of 30-40 had a mean value of 2.64 (SD = 0.69), while those above 40 years had a mean value of 2.96 (SD = 0.83). This result therefore indicates that older single women experience more stigmatization than younger single women. Further testing using independent samples t-

test revealed that a t-value of 2.23 was obtained with a corresponding p-value of 0.025 which was lesser than the chosen alpha of 0.05. This result therefore indicates that older single women experience a significantly higher level of stigmatization than younger single women. The null hypotheses was therefore rejected.

**Table 4: Independent samples t-test of stigmatization experience of women based on their highest educational qualification**

Highest Education Qualification	N	Mean	SD	DF	t	p	Decision
Primary/Secondary	27	2.95	0.75	148	1.97	0.043	Reject H <sub>02</sub>
Tertiary	123	2.65	0.77				P<0.005

From the result presented in Table 4, it is revealed that single women with either a primary or secondary educational qualification had a mean value of 2.95 (SD = 0.75), while those with secondary qualifications had a mean value of 2.65 (SD = 0.77). This result therefore indicates that single women with less educational qualification experience more stigmatization than those with higher educational

qualification. Further testing using independent samples t-test revealed that a t-value of 1.97 was obtained with a corresponding p-value of 0.043 which was lesser than the chosen alpha of 0.05. This result therefore indicates that single women with lesser educational qualification experience a significantly higher level of stigmatization than single women with



higher educational qualification. The null hypotheses was therefore rejected.

**Table 5: Independent samples t-test of stigmatization experience of women based on their singlehood status**

Singlehood Status	N	Mean	SD	DF	t	p	Decision
Never-Married	98	3.04	0.59	148	6.24	0.0005	Reject H <sub>0</sub>
Separated/Divorced/Widowed	52	2.56	0.93				P<0.005

From the result presented in Table 5, it is revealed that never-married single women had a mean value of 3.04 (SD = 0.59), while those who were either separated/divorced/widowed had a mean value of 2.56 (SD = 0.93). This result therefore indicates that never married single women experience more stigmatization than those who are either separated/divorced/widowed. Further testing using independent samples t-test revealed that a t-value of 6.24 was obtained with a corresponding p-value of 0.0005 which was lesser than the chosen alpha of 0.05. This result therefore indicates that never-married single women experience a significantly higher level of stigmatization than single women who are either separated, divorced or widowed. The null hypotheses was therefore rejected.

## DISCUSSION OF FINDINGS

From the result obtained in the study from research question one, it was revealed that most of the stigmatization experienced by single women in Rivers State were interpersonal in nature. This is because the highest ranking forms of stigmatization such as loss of friends and social network, insult and name calling, disrespect by family members and suspicions are related to the immediate social environment of the women. It was also shown that institutional stigmatization such as difficulty in renting apartment and discrimination in employment and business were also experienced by single women in the state. The result of this study is in agreement with that obtained by Macvarish (2006) who should that women in Britain were called derogatory names. Similarly, as Gaetano (2010) opined, women in China are referred to as leftover women, a form of insulting and derogatory term which affects their self-esteem and worth.

Regarding institutional stigmatization, the result of this paper is in line with the finding from Kalmijn et al (2005) who found that being single leads to wider social segregation. In a related study, Toukhoushian (1998) revealed that single men lose out on business and employment opportunities when compared to their married counterparts. Also, Ntoimo and Isiugo-Abanihe (2014) revealed in their study that insult and name calling was one of the major form of stigmatization experienced by single women in Lagos State. These mentioned studies further confirmed that

single women experience varied form of stigmatization due to their status.

From the testing of the developed hypotheses, the result showed that older single women experience a significantly higher level of stigmatization than younger single women. This result might be due to the fact that most of the older women are way beyond the age of childbearing and no longer as attractive as the younger ones. Furthermore, the younger single women might still be in a relationship with the hope that it might end in marriage as compared to the other women. Another of the hypotheses revealed that less educated single women experience a significantly higher level of stigmatization than those with higher educational qualification. This findings might have been obtained because those with higher educational qualifications might be more stable financially which could compensate for their status as compared to those who have lower educational qualification. Finally, the result showed that never-married single women experience a significant higher level of stigmatization than those who were previously married. This result might be due to the fact that those who were previously married have children as well as other family members despite the separation, divorce or death of their spouse. These findings corroborate the assertion of Ntoimo and Isiugo-Abanihe (2014: 6134) that “marriage is still the norm in Nigeria, heterosexual family is typical; and approved womanhood is still associated with the dyadic role of wife and mother.”

## RECOMMENDATIONS

From the result obtained in this study, the following recommendations were made:

1. There should be a policy that prevents stigmatization against single people, especially females. Such a policy should be enforced by the government through appropriate agencies to ensure that stigmatization against women is minimized.
2. During the filling of forms and other official documents, the sections for marital status should be eliminated to minimize bias against those who are still single.
3. Women support groups should be formed which provide legal and policy backings to



any single woman who feel stigmatized and discriminated against.

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# RE-EXAMINING OF PROCESSES AND ADVANCES FOR SAFE AND SOUND STEGNOGRAPHY

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## ABSTRACT

*This study focused on inspection of diverse steganography procedure intended for enciphering the information. A procedure called steganography that permits the individual to conceal the information inside an image though adding up a small amount of perceptible modifies. This study talks about the thought at the back the steganography with looking at initially the steganography introduction as well as the expressions so as to be associated to steganography. This study looks at the steganography process –image, acoustic, video, text so as to be utilized to implant the data in digital mediums. 2 generally significant features of image supported steganography scheme are the superiority of stego image as well as the ability of the cover up image. Through re-examining this study, investigators can expand an enhanced steganography procedure on the way to amplify the MHC as well as Peak Signal to Noise Ratio assessment through observing the surviving procedures of steganalysis.*

**KEYWORDS:** steganography, MHC, Peak Signal to Noise Ratio

## 1. INTRODUCTION

Steganography is a word comes from Greek phrases Steganous+Graphy where meaning of Steganous is “enclosed” and meaning of graphy is “inscription”.Therefore it is called “enclosed inscription”.It is a procedure utilized to conceal the communication and avert the uncovering of concealed communication. Steganography [2], known as image steganography is a present means of concealing data in a manner so as to the unnecessary persons may not right to use the data. Information exploited to conceal information in steganography can be text, audio, video or image. In current period, image steganography can be helpful in a number of ways such as hiding the secret data [2], data authentication, ensuring authenticated data availability for academic usage, monitoring of data piracy, labelling electronic data/contents, copyright protection, ownership identification, providing confidentiality and integrity enhancement control of electronic data piracy etc.[3].

As needs be, the structure of this paper is as per the following: Area 2 surveys the Steganographic Expressions. Segment 3 gives a condition of-craftsmanship audit and investigation of various existing strategies for Steganography drawn from writing study. Steganography Applications are introduced in Area 4. Area 5 audits the various sorts of Steganography. At long last, the proposed technique and end is introduced in Area 6.

## 2. STEGANOGRAPHIC EXPRESSIONS

Cover Folder: It is a record where concealed data will be put away.

Stego Means: Medium through which the data is covered up.

Communication: The information to be covered up or extricated.

Steganalysis: Distinguish the presence of message.

## 3. ASSOCIATED EXERTION

In the connected work, the most well-known technique which is utilized to conceal the message include the use of Least Significant Bit created by [1],by applying the sifting, veiling and change on the cover media. [2] proposed Least Significant Bit coordinating returned to picture steganography and edge versatile plan which can choose the implanting areas as indicated by the size of mystery message For enormous installing rates, smooth edge locales are utilized while for lower inserting rate, more honed districts are used.[3] propose a picture steganographic technique dependent on mayhem and euler Hypothesis in which concealed message can be recuperated utilizing circles which is not quite the same as the implanting circles, and the first picture isn't needed to separate the shrouded message. [4] Use another Picture steganography conspire dependent on Least Significant Bit substitution strategy and pixel esteem differencing. This plan include substitution of least huge pieces to shroud the



hued message picture with the high level Least Significant Bit philosophy wherein the touch substitution happens in agreement to go determined for the shading pictures. [5], proposed a validation model of steganography to identify any assault on the stego picture by adjusts two coefficients of the Discrete Wavelet Change in each line of cover picture dependent on a confirmation code. [6] has proposed another strategy to counter the factual assault is known as Out Conjecture. In this strategy remedies are made to the coefficients to make the stego-picture histogram coordinate the cover picture histogram. [7] utilized entropy based method for finding the coefficients in the picture where message can be implanted with least twisting. [8] given an equivalent content steganographic method in which the words in American English are subbed by the words having various terms in English and the other way around. [9] examined distinctive steganography instrument calculations and characterized the apparatuses into spatial space, change area, record based, document structure based and different classes, for example, spread range procedure and video compacting encoding.

#### 4. STEGANOGRAPHIC APPLIANCES

Steganography give safe correspondence and help in putting away of mystery information. It can shroud a mystery communication in another communication, be it text, picture, sound or whatever media that someone choose to conceal the mystery communication in it. Different applications are television broadcasting, video-sound synchronization, security of information change, organizations safe course of mystery information, Access control framework for computerized content circulation.

#### 5. STEGANOGRAPHIC CATEGORIES

Steganography might be named unadulterated, symmetric and unbalanced. While unadulterated steganography needn't bother with any trade of data, symmetric and lopsided need to trade of keys earlier sending the messages. Steganography is profoundly reliant on the sort of media being utilized to conceal the data. Medium being usually utilized incorporate content, pictures, sound records, and organization conventions utilized in organization transmissions. Picture Steganography is by and large more favored media as a result of its innocuousness and fascination. Moreover trade of welcome through advanced methods is on the expansion through the expanded utilized of the web and simplicity of solace and adaptability is sending them. Innovation progression in plan of cameras and advanced pictures being saved in cameras and afterward move to computers [10] has additionally upgraded numerous folds. Furthermore, the instant messages covered up

in the pictures don't mutilate the picture and there are procedures which just upset just the slightest bit of a picture whose impacts is practically unimportant on its quality. The major drawbacks of steganography are that one can conceal almost no data in the media picked. A few techniques are given as:

- Enciphering mystery communication in content/reports
- Enciphering mystery communication in sound
- Enciphering mystery communication in pictures

#### 6. CONCLUSION

In the previous time, the steganography is intrigued point for picture cover media. This study give a diagram of steganography and present a few procedures of steganography which help to implant the data. These methods are more valuable for recognizing the stego pictures just as the picture media identifying with safety of pictures and insert the information for complex picture zone and someone can without much of a stretch gauge the high implanting rate by utilizing the quantitative steganalytic strategy.

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# FORMULATION AND EVALUATION OF MICROEMULSION BASED GEL OF POSACONAZOLE FOR TOPICAL DELIVERY

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## ABSTRACT

**Background:** Microemulsion is one of the promising sub-micron carriers for topical drug delivery as it offers advantages like high drug-loading capacity and good skin penetration. Microemulsion based gel of posaconazole (broad-spectrum antifungal agent) could be an effective strategy for treatment of topical fungal infections.

**Objective:** To develop microemulsion based hydrogel of posaconazole was for effective treatment of skin mycosis.

**Methods:** Optimized microemulsion batches were selected through pseudoternary phase diagram (using oleic acid, tween 80 and IPA as oil, surfactant and co-surfactant, respectively) followed by stability studies and characterization.

**Results:** The drug content and pH were found in the desired range. The droplet size of optimized formulations were found within the desired range (<200nm). The hydrogel prepared (from selected microemulsion batches) were found to have good spreadability and texture (adequate adherence). The in-vitro and ex-vivo studies exhibited effective VCZ flux from microemulsion based gel. The skin retention of the drug from F12-Me-Gel was significantly higher when compared with the microemulsion (F12-ME) as well as the conventional gel. Similarly, the diameter of the zone of inhibition (against *Candida albicans*) of F12-Me-Gel found to be higher than the microemulsion batch (F12-ME). Moreover, the skin irritation studies confirmed the benignity of the microemulsion based gel. Furthermore, the formulation was found to be stable at various temperatures ( $5 \pm 3$ ,  $25 \pm 2$  and  $40 \pm 2$  °C) as reported by the stability studies.

**Conclusion:** posaconazole loaded microemulsion based gel could be used effectively for the treatment of topical fungal infections.

**KEYWORDS:** Microemulsion, hydrogel, posaconazole, pseudoternary phase diagram, *Candida albicans*, sub-micron carriers, co-surfactant.



## 1. INTRODUCTION

Fungal infections are the most prevalent forms of skin infections and occur mostly in moist and humid climates. The leading cause of superficial infection is the opportunistic infection caused by *Candida* spp [1]. Though *Candida* is the leading cause of the superficial opportunistic infections but there is limited number of availability in the antimycotics therapy [2]. Azoles are the most commonly used antifungal agents in the treatment of both systemic and superficial infection. Different types of azoles include itraconazole, fluconazole, posaconazole and posaconazole. Among them posaconazole has exhibited higher potency in *in vitro* studies against broad range of yeast infections [3-4]. posaconazole (VCZ) is a broad spectrum triazole antifungal agent which is derived from fluconazole. It disrupts the fungal cell membrane by inhibiting 14 $\alpha$ -methyl group of lanosterol which is an important step in the synthesis of ergosterol [5-6]. Recent clinical studies proposed topical VCZ as a new and promising therapy for fungal keratitis in combination with systemic VCZ [7-8]. As there is no topical formulation of voriconazole available in the market, so the present study aims to develop effective topical delivery system of VCZ.

Topical delivery of the drug offers several advantages over other routes of administration like patient compliance, ease of administration, release of effective drug concentration at the target site, bypass of first pass metabolism and degradation of drug by gastric acid and juices as occurred in oral delivery as well as preventing contraindications of the drug with other drugs. Furthermore, the therapy can be withdrawn or removed when not desired or any adverse effect occurs, thus, increasing efficacy of the drug and reducing the side effects associated with intravenous and oral formulation such as nausea, headache, blurred vision, chills and convulsions [9].

However, the efficacy of drugs is adversely affected by the protective barrier of skin (stratum corneum). To overcome the limited penetration of drugs through the stratum corneum, researchers have developed many formulation strategies (especially *via* nanotechnology). Some of the drug delivery systems includes microemulsions, liposomes, solid lipid nanoparticles, microspheres, ethosomes, niosomes, dendrimers, microparticles and nanostructured lipid carriers [10].

Microemulsions are one of the interesting and promising sub-micron carriers for topical drug delivery. These are transparent, optically isotropic and thermodynamically stable dispersions of oil in water (o/w) or water in oil (w/o) in the presence of amphiphilic compounds (surfactant and co-surfactant) [11]. Microemulsions offer several advantages like high drug-loading and good skin penetration (by reducing the diffusional barrier of the stratum corneum) with acceptable biocompatibility (due to the presence of physiologi-

cal lipids/oils) [12, 13]. Furthermore, microemulsions do not require any expensive sophisticated instruments for preparation and therefore, the cost of preparation as well as time required for its preparation is less.

Recently, researchers successfully exploited microemulsion based gels for transdermal delivery of several drugs like diclofenac, clobetasol, bifonazole, penciclovir, lacidipine, *etc.* [14-18]. Hence, this research deals with the development and characterization of VCZ microemulsion based hydrogel for improved transdermal delivery.

## 2. MATERIALS AND METHODS

### 2.1. Materials

VCZ was a gift sample from Lifecare Innovations Pvt. Ltd. (Gurgaon, India). Oleic Acid (OA), Isopropyl Myristate (IPM), tween 80, propylene glycol, cotton seed oil, castor oil, liquid paraffin, and span 80 were purchased from S.D. Fine Chemicals (Mumbai, India). Plurol oleique was a gift sample from Gattefosse India (Mumbai, India). All other chemicals used in the study were of analytical reagent grade.

### 2.2. Methods

#### 2.2.1. Equilibrium Solubility Studies (Selection of Micro-emulsion Components)

The various components of microemulsion such as oils (Captex 200, castor oil, sesame oil, oleic acid, cottonseed oil, liquid paraffin and IPM), surfactants (Tween 80 and Plurol oleique) and co-surfactants (IPA, butanol, propylene glycol) were selected to perform solubility studies of VCZ. The drug was added in excess to the excipients in tightly closed vials and was kept at 37 $\pm$ 2 $^{\circ}$ C under agitation in the water bath shaker for 72 hours for equilibration. The dispersions were centrifuged at 3000 rpm for 15 min and the supernatant was filtered through 0.45 $\mu$ m membrane filter. The amount of VCZ solubilized was analyzed using UV-visible spectrophotometer at 256 nm.

#### 2.2.2. Pseudoternary Phase Diagram and Stability Studies

##### 2.2.2.1. Construction of Pseudoternary Phase Diagrams

For construction of each phase diagram, oil and specific  $S_{mix}$  ratio (surfactant:co-surfactant) were mixed carefully in diverse weight ratios from. Initially, 5% w/w oil was added to the surfactant mixture with varied concentration (5% to 90% w/w) and the remaining concentration of water was added to make the dispersion 100%. This process was repeated for the different oil concentration varied from 5-90 % w/w. The visual appearance of the homogenous mixture was noted down for clear and easily flowable o/w microemulsions.



### 2.2.2.2. Stability Evaluation of Microemulsion

#### 2.2.2.2.1. Thermodynamic Stability

Thermodynamic stability of the prepared microemulsions at different concentration of Oil mixture and Smix was performed to overcome the problem of metastable formulations. Initial screening of microemulsions was performed on the basis of thermodynamic stability.

#### 2.2.2.2.2. Heating Cooling Cycle

It was performed by keeping the microemulsions at two different temperatures *i.e.*, refrigerated temperature (4°C) and at the higher temperature (45°C). Six cycles were studied with storage at each temperature not less than 48 h. Those formulations, which were stable at these temperatures, were subjected to further analysis.

#### 2.2.2.2.3. Centrifugation

Those formulations that passed the heating cooling cycle were then subjected to centrifugation test. The microemulsions were centrifuged at 3500 rpm for 30 min. Those formulations that did not show any phase separation were taken for the freeze thaw stress test.

#### 2.2.2.2.4. Freeze Thaw Cycle

Three freeze thaw cycles between -21°C and +25°C with storage at each temperature for not less than 48 h were performed for the microemulsions. This test was performed to see whether the microemulsions were stable at very low temperature and whether it comes back to the stable form after freezing it.

## 3. CHARACTERIZATION OF MICROEMULSION

### 3.1. Preparation of Drug Incorporated Microemulsion

The drug was accurately weighed (1% w/w) and dissolved in the mixture of oil and surfactant using vortex mixture and then the required water was added. It was left for 24 h to equilibrate and observed for appearance of visible changes (if any).

### 3.2. Globule Size and Polydispersity Index (PDI)

The average globule size and PDI of microemulsions were determined by photon correlation spectroscopy. Measurements were made using Zetasizer 1000 HS (Malvern Instruments, Worcester-shire, UK), wherein light scattering was monitored at 25°C at a 90° angle.

### 3.3. Transmittance and Conductivity

Transparency of microemulsion formulation was determined by measuring the percentage transmittance at 650 nm with reference to purified water (taken as blank) using UV spectrophotometer (Shimadzu 1700, Japan). The electric conductivity ( $\sigma$ ) was measured by means of a digital conduc-

tivity meter (ELICO, CM 180) at  $25 \pm 0.5$  °C.

## 4. FORMULATION AND CHARACTERIZATION OF MICROEMULSION BASED GEL

The selected microemulsions were incorporated in 1% w/v of gel Carbopol 934 to make their hydrogels formulation. Carbopol gel was prepared by adding carbopol hot boiling water. The gel was allowed to swell for 6-8 hours and thus kept overnight. The pH of the gel was made around 5.8 by adding triethanolamine dropwise. Then equal amount of microemulsion (containing 2% w/v drug so that the final drug concentration becomes 1% w/v) and gel (1:1) was mixed thoroughly using glass rod.

### 4.1. pH and Drug Content

The pH of the microemulsions was recorded using a pH meter (CyberScan pH 51, Eutech Instruments). Drug content of microemulsions was analyzed by UV-visible spectrophotometer (Shimadzu 1700, Japan) at 256 nm.

### 4.2. Rheology

The rheology of the prepared formulations was measured using cone and plate viscometer of Anton Par Rheoplus, diameter is 0.149. Change in shear stress and viscosity with change in shear rate was recorded.

### 4.3. Spreadability

Spreadability of the sample was studied using glass plates (20 x 20 cm) of known weights with a graph paper of known diameter pasted on the back of one of the plates. 0.5 g of the formulation was kept on the centre of a glass plate below which a graph paper was kept. Another glass plate was placed over the formulation and the change in diameter was noted. Similarly, more plates were carefully placed on it to avoid sliding (that could lead to false result interpretations) and the change in diameter was measured again. The increase in diameter was observed after addition of each plate [19].

### 4.4. Texture Analysis

The texture (firmness and work of shear) of the developed formulations was evaluated using Texture Analyser TM (stable micro systems Ltd. UK) equipment equipped with a 5 kg load. It consists of two conical probes, upper and lower probe. Sample was placed into the lower cone carefully to eliminate the air pockets.

### 4.5. In Vitro Release Studies

*In vitro* release studies of the posaconazole incorporated in microemulsion based gel were performed using cellophane membrane (14000 Da) as diffusional barrier on the Franz diffusion cell assembly. The diffusional cross-sectional area of Franz diffusion assembly was 2.83 cm<sup>2</sup> and 30 mL



was the volume of the receptor. The temperature of the assembly was maintained at  $32 \pm 1$  °C with the help of thermo regulated outer jacket, while the diffusion medium was stirred continuously with the help of magnetic stirrer [20-21]. The receptor compartment contains media comprising 1% tween 80 phosphate buffer (pH 5.8). Tween 80 was added to maintain the sink conditions. 1g of the prepared formulations was applied uniformly onto the membrane in the donor compartment. Stirring rate was controlled *via* magnetic stirrer and an aliquot of 1 mL sample was withdrawn at suitable time intervals and was replaced with the same amount of media to maintain the receptor medium volume to 30 mL. The samples were diluted with an equal volume of the diluents and were analysed UV spectrophotometrically at a  $\lambda_{\text{max}}$  of 256 nm.

#### 4.6. Ex Vivo Study (Drug Permeation and Retention)

The *ex vivo* studies of the drug were also performed on the Franz diffusion cell. Drug permeation studies were carried out using excised abdominal skin of Wistar rats obtained from the Central animal house, Panjab University, Chandigarh. The shaved abdominal skin was wiped off using disinfectant (ethanol) to remove the adhering fat material and was further washed with lukewarm water to completely remove fatty material. The removed intact skin was mounted on the Franz diffusion cells with the stratum corneum side facing towards donor compartment and dermis side towards the receptor compartment. The receptor compartment having 30 ml of phosphate buffer saline was stirred continuously at ambient temperature. After specific intervals, 0.5 ml of samples were withdrawn

through sampling port of the receptor compartment and was replenished with the same volume of fresh phosphate buffer solution. All the withdrawn samples were filtered through 0.45  $\mu$  membrane filter and the amount of drug was analysed by HPLC at 256 nm. The amount of drug retained within the skin was determined using HPLC after rinsing and homogenizing the tissue.

#### 4.7. In Vitro Antifungal Activity

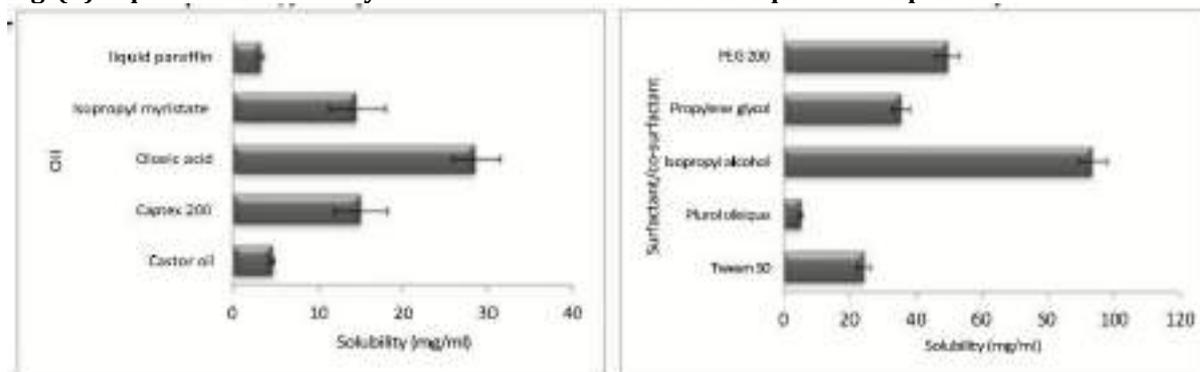
##### 4.7.1. Determination of Minimum Inhibition Concentration (MIC)

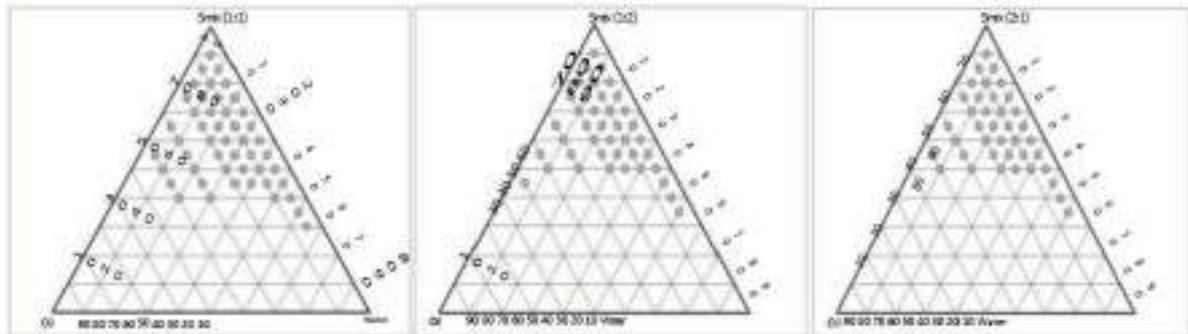
The minimum inhibition concentration of the drug was determined by dilution method. The fungal inoculum was standardized by McFarland reagent having cell count of  $10^6$  cells/mL. The final concentration of inoculum should be  $5 \times 10^2$  to  $2.5 \times 10^3$  cells/mL for determining MIC and therefore it was diluted 10 times with sterile 0.85% saline (NCCLS). Then 100 $\mu$ L of the inoculum was inoculated in sterilised test tubes containing 1 mL of the drug solution and 8.9 mL of the Sabouraud Dextrose Broth (SDB). It was visually observed after 24 h and 48 h. The minimum concentration at which the growth of the fungus was inhibited was taken as MIC of the drug.

##### 4.7.2. Determination of Zone of Inhibition by Agar Well Method

Sabouraud Dextrose Agar (SDA) was made and when the temperature reached around 40°C; the standardized inoculum was added so that the final concentration in the plate remained to be  $10^3$  cells/mL. (SDA) was poured into the plates in the sterile conditions and was allowed to solidify. After solidification,

Fig. (1). Equilibrium solubility studies of VCZ in various non-aqueous components



**Fig. (2). Optimization of microemulsion region using pseudoternary phase diagram.**

agar wells were made with a sterilised borer and the known and equal amount of formulations were added to each plate. The zone of inhibited growth by the formulation was measured after 24 h at 30°C.

#### 4.8. Skin Irritancy Studies

Modified Draize tests were used to access the skin irritancy potential of the prepared formulation. The protocol of the experiment was approved by institutional animal's ethical committee, Panjab University, Chandigarh. The animals were kept under standard laboratory conditions, with temperature of  $25 \pm 1^\circ\text{C}$  and relative humidity of  $55 \pm 5\%$ . The animals were divided into three groups (each group contains 5 animals). The rats were shaved 48 h prior to the treatment and

0.5 g of the optimised formulations was applied daily for seven days on hair free skin of rats by uniform spreading within the area of  $4\text{ cm}^2$ . The skin was observed for any visible changes such as erythema (redness) for four weeks after application of saline (group I), irritant (group II) and optimized formulation (group III). The mean erythematous scores were recorded (ranging from 0 to 4) depending on the degree of erythema [22].

#### 4.9. Stability Studies

The optimized microemulsion based gel formulations were subjected to stability studies at different temperatures for a period of three months. Formulations were kept at different temperatures,  $5 \pm 3^\circ\text{C}$ ,  $25 \pm 2^\circ\text{C}$  and  $45 \pm 2^\circ\text{C}$ . All the formulations were tested for spreadability, colour, grittiness, pH and drug content after one month, two months and three months

#### 4.10. Statistical Analysis

Simple analysis of variance (one-way ANOVA, GraphPad Prism 5) was used to determine statistically significant differences between the results and values with  $p < 0.05$  were considered statistically significant as analyzed by the Dunnett test.

## 5. RESULTS AND DISCUSSION

### 5.1 Solubility and Pseudoternary Phase Diagram

Based on the solubility studies (Fig. 1), oleic acid ( $28.61 \pm 2.77\text{ mg/mL}$ ), tween 80 ( $23.86 \pm 2.11\text{ mg/mL}$ ) and IPA ( $93.68 \pm 4.22\text{ mg/mL}$ ) were selected as oil, surfactant and co-surfactant, respectively. The o/w microemulsion was prepared by drop-wise addition of oil in the pre-mixed dispersion of water, surfactant and co-surfactant.

Hydrophilic-Lipophilic Balance (HLB) of surfactant (non-ionic) plays an important role in the formation and stabilization of microemulsions as the value ranges from 3-6 for w/o microemulsion and 8-18 for o/w microemulsion. However, a blend of low and high HLB surfactants has been usually preferred for microemulsion preparation. Besides, addition of co-surfactant (like short chain alcohols) further enhances the stability as well as fluidity of the microemulsions by preventing formation of rigid structures like liquid crystals [23-24].

The phase diagrams were constructed comprising different  $S_{\text{mix}}$  ratio (tween 80: IPA) i.e., 1:1 1:2 and 2:1 (Fig. 2). These phase diagrams helped in determination/selection of microemulsion region with desired concentration range of the components (Oil,  $S_{\text{mix}}$  and water. Microemulsion points that passed thermodynamic stability tests were selected for further characterization and analysis.

### 5.2 Selection and Characterization

#### 5.2.1 Selection of Microemulsion

Formulations that passed the thermo stability and dispersibility tests were selected for further evaluations. From these stable microemulsions, batches with lower  $S_{\text{mix}}$  (surfactant and co-surfactant) concentration were selected from each pseudoternary diagram. These microemulsion batches were further characterized for globule size, drug content, visual evaluation and pH.



### 5.2.2 Characterization of Microemulsion

The globule size was in the range of  $33.29 \pm 3.42$  to  $317.3 \pm 4.83$  nm as shown in Table 1. The globule sizes were found to increase with increasing oil content and/or decreasing  $S_{mix}$  content (for each phase diagram). The

PDI of microemulsion batches ranged from  $0.296 \pm 0.132$  to  $0.844 \pm 0.068$  i.e. consisted of batches having both narrow as well as broad particle distribution.

**Table 1. Composition and characterization of microemulsions.**

S.No.	Components (%v/v)				Zetasizer		Transmission (%)	Conductivity ( $\mu$ S)
	$S_{mix}$	Oil	water	$S_{mix}$	Size (nm)	PDI		
F1	1:1	5	65	30	$33.29 \pm 3.42$	$0.729 \pm 0.123$	$96.83 \pm 2.23$	$115 \pm 2.31$
F2		10	45	45	$39.77 \pm 2.54$	$0.844 \pm 0.068$	$95.36 \pm 1.16$	$98 \pm 1.66$
F3		15	35	50	$91.76 \pm 1.92$	$0.795 \pm 0.12$	$82.5 \pm 2.25$	$82 \pm 3.21$
F4		20	40	40	$125.4 \pm 4.52$	$0.589 \pm 0.141$	$86.9 \pm 1.06$	$87 \pm 2.11$
F5		30	25	45	$145.8 \pm 3.23$	$0.532 \pm 0.073$	$20.46 \pm 2.33$	$112 \pm 3.44$
F6	1:2	5	60	35	$85.84 \pm 2.11$	$0.496 \pm 0.054$	$98.99 \pm 0.46$	$98 \pm 2.16$
F7		10	40	50	$104.9 \pm 3.15$	$0.82 \pm 0.021$	$92.46 \pm 1.34$	$90 \pm 3.22$
F8		15	35	50	$143.1 \pm 3.56$	$0.342 \pm 0.021$	$92.75 \pm 2.17$	$82 \pm 1.06$
F9		20	25	55	$317.3 \pm 4.83$	$0.85 \pm 0.131$	$86.92 \pm 0.78$	$76 \pm 1.33$
F10		30	20	50	$236.5 \pm 3.42$	$0.791 \pm 0.153$	$29.65 \pm 2.23$	$72 \pm 2.31$
F11	2:1	5	65	30	$124.5 \pm 2.54$	$0.531 \pm 0.048$	$99.34 \pm 0.16$	$106 \pm 2.22$
F12		10	45	45	$69.85 \pm 3.72$	$0.296 \pm 0.132$	$99.26 \pm 0.15$	$88 \pm 3.37$
F13		15	35	50	$113.7 \pm 3.51$	$0.436 \pm 0.121$	$93.92 \pm 1.36$	$84 \pm 2.46$
F14		20	20	60	$163.8 \pm 2.23$	$0.745 \pm 0.063$	$96.44 \pm 2.33$	$75 \pm 3.22$
F15		30	20	50	$143.4 \pm 2.47$	$0.479 \pm 0.044$	$67.31 \pm 2.46$	$70 \pm 2.26$

**Table 2. Characterization of microemulsion based gel.**

Batch	Spreadability (%)	Texture		pH	Drug content (%)	<i>In vitro</i> flux ( $\mu$ g/cm <sup>2</sup> .h)
		Firmness (g)	Work of shear (g.sec)			
F6	$233.33 \pm 6.32$	$1482.43 \pm 6.23$	$305.43 \pm 3.45$	$5.45 \pm 0.04$	$98.61 \pm 0.58$	$5.43 \pm 0.39$
F8	$227.78 \pm 4.55$	$1514.16 \pm 5.55$	$328.61 \pm 4.22$	$5.58 \pm 0.13$	$98.65 \pm 0.90$	$3.69 \pm 0.34$
F12	$233.33 \pm 3.74$	$1596.32 \pm 4.39$	$358.85 \pm 3.21$	$5.68 \pm 0.24$	$99.50 \pm 0.17$	$5.93 \pm 0.77$
F13	$250 \pm 5.22$	$1428.17 \pm 5.67$	$302.75 \pm 2.78$	$5.69 \pm 0.12$	$98.82 \pm 0.72$	$3.46 \pm 0.54$

The transmittance of the formulations ranged from  $20.46 \pm 2.33$  to  $99.34 \pm 0.16\%$  while the conductivity was found between  $70 \pm 2.26$  and  $115 \pm 2.31$  (suggesting the presence of o/w microemulsions).

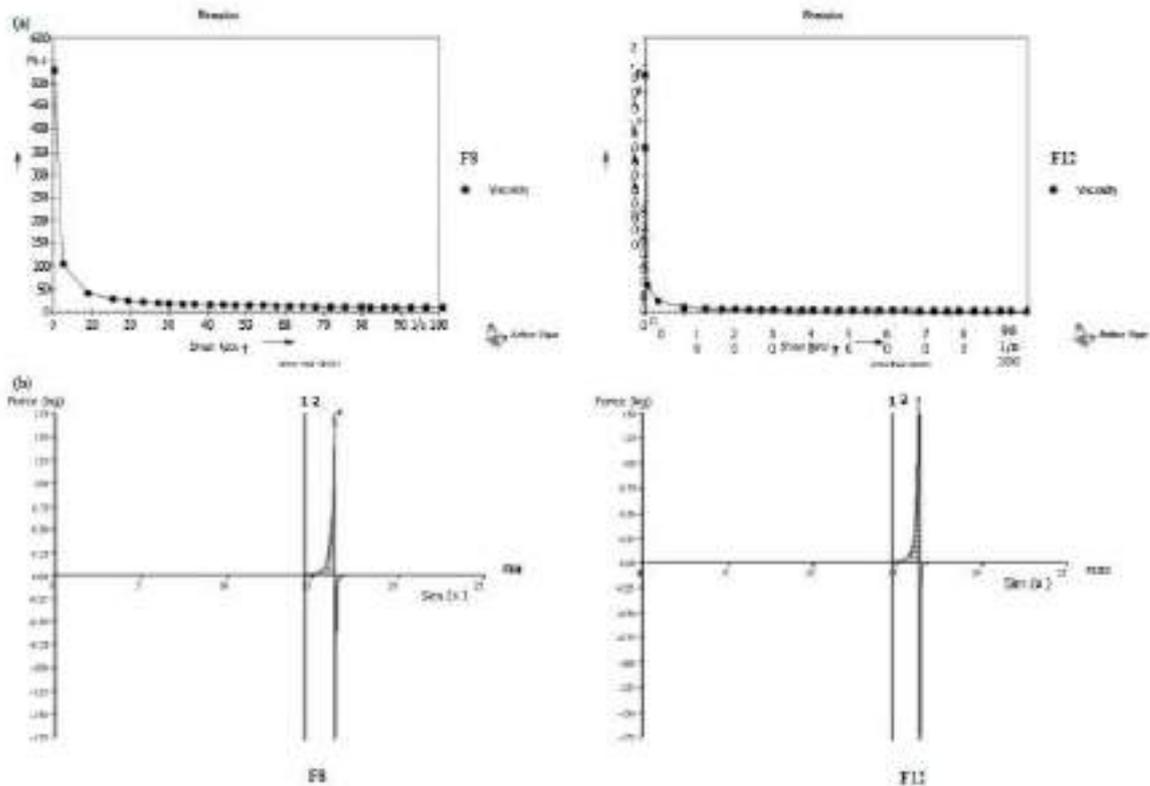
With respect to the various formulation aspects, lower size ( $< 200$  nm), narrow size distribution ( $< 0.5$ ) and higher clarity ( $\%T > 90$ ) were considered as the primary criteria for the selection of batches (*viz.* F6, F8, F12 and F13) for preparation of microemulsion based gel.

### 5.2.3 Characterization of Microemulsion Based Gel

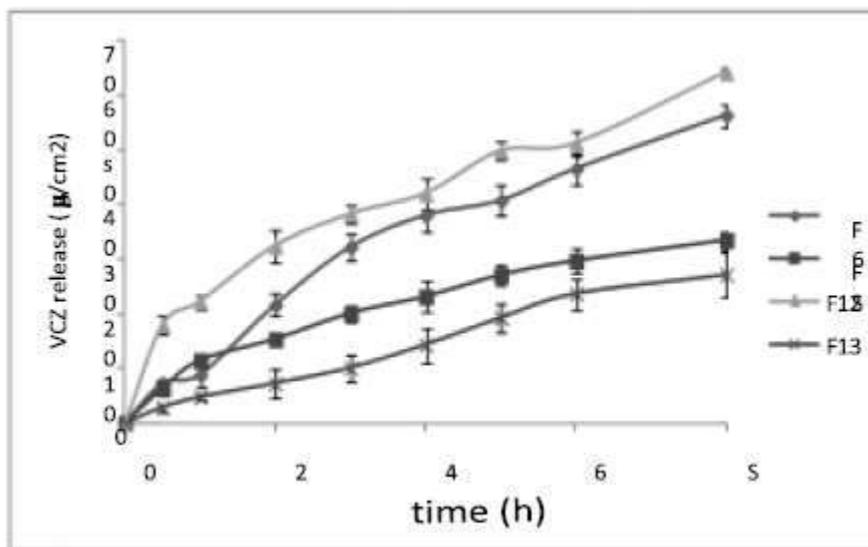
The pH of the microemulsion based hydrogels was between 5.68 and 5.87 which is similar to the pH of skin surface (pH=5.5) that might prevent the occurrence of any irritation or caustic reaction. The

rheogram of the formulations indicates the pseudoplastic (shear thinning) behaviour as the consistency/viscosity of the formulation decreases with increasing shear rate (Fig. 3a). Such properties are highly beneficial for transdermal system as they facilitate easy application of the formulation on the skin. Further, the high spreadability values (Table 2) supported the pseudoplastic properties of microemulsion based gels.

The firmness values of the formulations were in the range of  $1482.43 \pm 6.23$  to  $1596.32 \pm 4.39$  g and work of shear was found between  $302.75 \pm 2.78$  to  $358.85 \pm 3.21$  g.sec (Table 2). The high value of firmness indicates that the formulation will be adhered to the skin appreciably and for longer period which would help to deliver the drug to the skin for longer duration (Fig. 3b).



**Fig. (3).** (a) Pseudoplastic behaviour (b) Texture analysis of microemulsion based gels (F8 & F12).



**Fig. (4).** In vitro release studies of microemulsion based gels

The content of the drug in the microemulsion based gels formulations were found in the range of  $97.81 \pm 1.53$  % to  $99.08 \pm 0.63$  (Table 2). This indicates a higher loading of drug in prepared formulations.

### 5.3 In Vitro Drug Release Studies

The permeation flux was calculated from the slope of the linear graph plotted between drug

released per unit area versus time (Fig. 4). The area of contact between the membrane and the formulation was  $2.8 \text{ cm}^2$ . The formulation F12 ( $5.93 \pm 0.77 \text{ } \mu\text{g}/\text{cm}^2 \cdot \text{h}$ ) showed comparatively higher permeation flux in contrast to F6 ( $5.43 \pm 0.39 \text{ } \mu\text{g}/\text{cm}^2 \cdot \text{h}$ ), F8 ( $3.69 \pm 0.34 \text{ } \mu\text{g}/\text{cm}^2 \cdot \text{h}$ ) and F13 ( $3.46 \pm 0.54 \text{ } \mu\text{g}/\text{cm}^2 \cdot \text{h}$ ).

Hence, based on good spreadability, texture, drug

content and *in vitro* permeation flux, formulation F12 (microemulsion based gel) was selected as the optimized batch for performing *ex-vivo* and irritation studies.

**5.4 Ex Vivo Skin Permeation Studies**

Statistically significant ( $p \leq 0.05$ ) skin permeation flux of F12-ME-Gel ( $12.61 \pm 0.53 \mu\text{g}/\text{cm}^2\cdot\text{h}$ ) and F12-ME ( $15.01 \pm 0.85 \mu\text{g}/\text{cm}^2\cdot\text{h}$ ) was found when compared with conventional gel ( $0.62 \pm 0.23 \mu\text{g}/\text{cm}^2\cdot\text{h}$ ) of VCZ (Fig. 5). The lower flux of microemulsion based gel in comparison to the ME could be due to the good adhesive property of the gel that resulted in tighter contact with the skin and hence, released lesser extent of the drug [21]. Further, the meagre flux of the conventional gel may be due to the poor penetration of the drug into the stratum corneum.

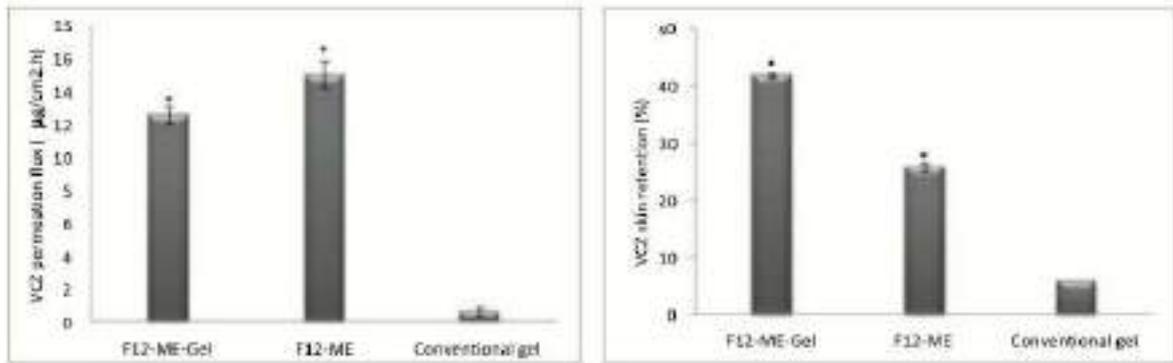
The skin retention of VCZ was found significantly higher (p

$\leq 0.05$ ) for F12-ME-Gel ( $41.83 \pm 0.49\%$ ) followed by F12-ME ( $25.7 \pm 0.68\%$ ) and conventional gel ( $5.83 \pm 0.11\%$ ). For the treatment of topical infections, the retention of drug is an important parameter for better efficacy of the drug as it ensures higher concentration of drug in the skin for longer duration.

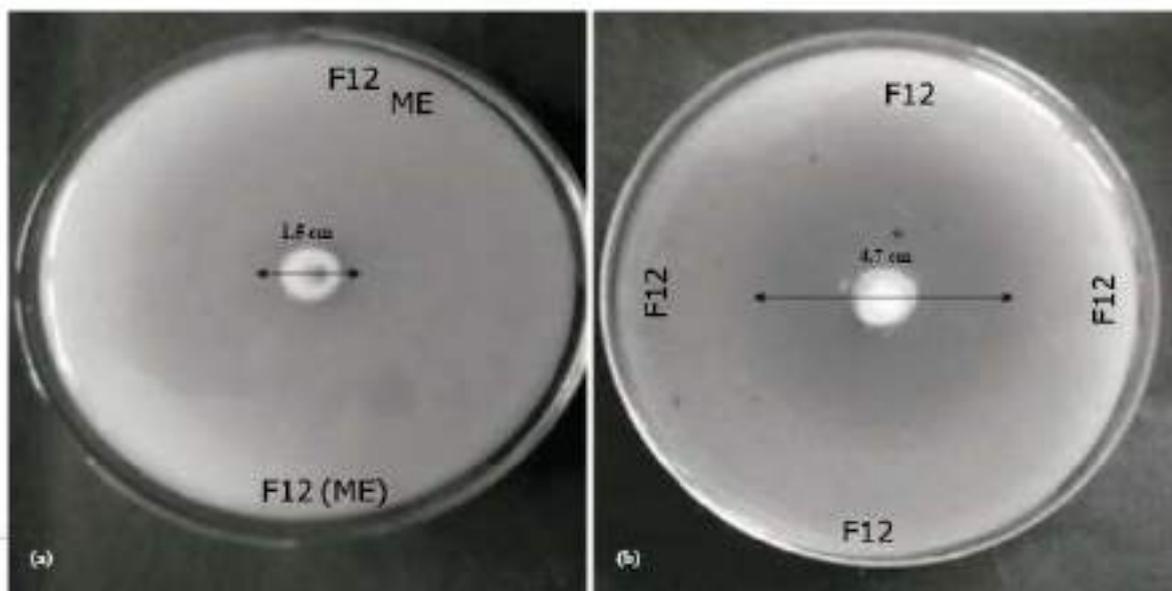
Sahoo and co-workers exhibited improved skin retention of sertaconazole from the hydrogel of microemulsion [13]. Similar studies were conducted by Hashem and co-workers wherein microemulsion gel form displayed better retention of clotrimazole as compared to the liquid microemulsion [21].

**5.5 In Vitro Antifungal Activity**

The MIC of VCZ against *candida albicans* was found to be  $4 \mu\text{g}/\text{mL}$ . It is the minimum concentration of the drug in which the growth of the microorganism is inhibited.



**Fig. (5).** *Ex vivo* studies of microemulsion based gels (a) permeation flux (b) skin retention (\*P ≤ 0.05, statistically significant as analyzed by Dunnett test).



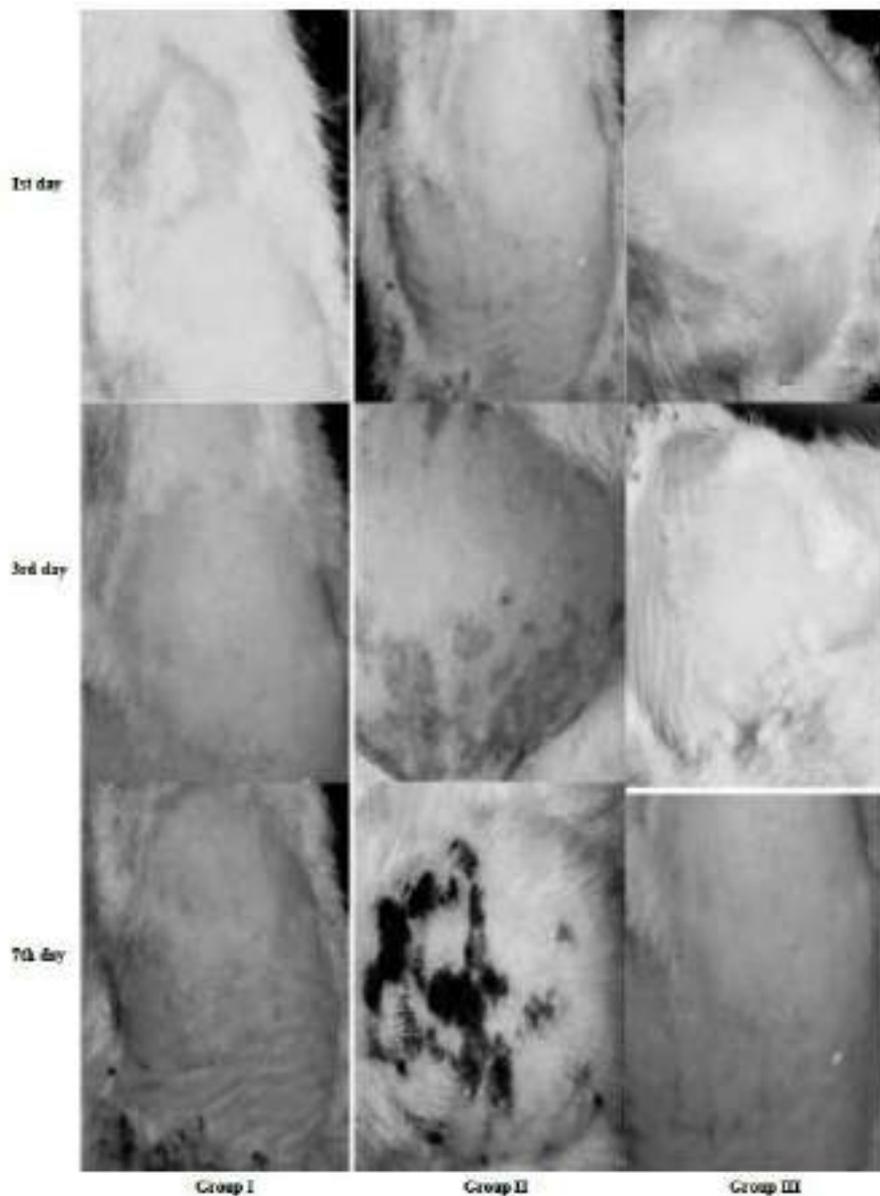
**Fig. (6).** Zone of inhibition of (a) F12-ME (b) F12-ME-Gel against *Candida albicans*.



**Table 3. Mean erythema scores of Wistar rat skin on various groups (n=5).**

Day s	Mean erythema score		
	Group I	Group II	Group III
1	0	0	0
2	0	0	0
3	0	1	0
4	0	1	0
5	0	2	0
6	0	2	0
7	0	3	0

0 (No erythema); 1(Light erythema); 2 (Moderate erythema); 3 (Moderate to severe erythema); 4 (Severe erythema)



**Fig. (7). Skin irritancy studies on Wistar rats.**

The comparison of the efficacy of F12-ME- Gel and F12- ME was done by measuring the zone of



inhibition of fungal growth as shown in Fig. (6). The formulations were poured in the well made in SDA plates and was allowed to diffuse for an hour and different inhibition zones were observed after 24 hours incubated at 30°C. A larger zone of inhibition of F12-ME-Gel (4.73±0.23 cm) was found in comparison to the F12- ME (1.53±0.06 cm) that

indicates a higher efficacy of the microemulsion based gel formulation. It could be attributed to the poor diffusion of the drug into the agar plate from the microemulsion, while on incorporation into gel enhances its tendency of diffusion which makes it more effective.

**Table 4. Stability studies of optimized formulation (F12-ME-Gel).**

Tem- pera- ture (°C)	Time (month)															
	Spreadability (%)				pH				Drug content (%)				Colour & grittiness			
	0	1	2	3	0	1	2	3	0	1	2	3	0	1	2	3
5 ± 3	233.33	222.22	222.22	216.67±	5.68	5.64	5.63	5.63	99.50	98.84	98.68	98.3	W & N	W & N	W & N	W & N
	±	±	±	3.21	±	±	±	±	±	±	±	7±				
	3.74	4.21	2.75		0.24	0.22	0.21	0.18	0.17	0.36	0.23	0.04				
25 ± 2	233.33	233.33	244.44	255.55±	5.68	5.68	5.68	5.63	99.50	98.83	98.73	98.3	W & N	W & N	W & N	W & N
	±	±	±	2.77	±	±	±	±	±	±	±	4±				
	3.74	3.22	5.06		0.24	0.32	0.12	0.22	0.17	0.68	0.43	0.91				
45 ± 2	233.33	244.44	250.11	261.11±	5.68	5.61	5.52	5.45	99.50	98.25	98.15	98.0	W & N	SY & N	SY & N	SY & N
	±	±	±	4.56	±	±	±	±	±	±	±	6±				
	3.74	2.54	3.22		0.24	0.11	0.21	0.34	0.17	0.78	0.38	0.43				

W = White; SY = Slightly yellow; N = Non-grittiness

### 5.6 Skin Irritation Studies

Unlike irritant (group II), no irritation was observed on the rats treated with topical application of control (group I) F12-ME-Gel (group III) until 7 days (Fig. 7). The erythemat- ic score of prepared formulation was zero as compared to the irritant (score=3) (Table 3). This confirmed the non-irritant nature of the formulation (F12-ME-Gel).

### 5.7 Stability Studies

Stability studies of the F12-ME-Gel were carried for three months at three different temperatures i.e., 5 ± 3oC, 25 ± 2oC and 45 ± 2oC. The formulations were tested after 1, 2 & 3 months for various parameters (Table 4). The formulations were found to be stable at different temperatures for three months.

There was no significant difference in the spreadability as well as pH of the formulation. Also, the drug content of the formulation was found almost similar at all temperatures which suggested the absence of any drug degradation at these conditions.

The formulations were opaque and white at refrigerated temperature and room temperature after 3 months while a slightly yellowish colour of the formulation was observed at 45oC. It may be

attributed to the change in the physical- chemical properties of any excipients at higher temperature.

### CONCLUSION

In the present study, the application of microemulsion systems in the gel form for the topical delivery of posaconazole was studied. Pseudoternary phase was used to optimize the formulations and selected formulations were evaluated. The results suggested that the skin permeation/retention properties of microemulsion have been increased by incorpo- rating microemulsion into gel form. Compared with conven- tional gel as well as microemulsion (F12-ME) of the posaconazole, the prepared formulation (F12-ME-Gel) has better permeation as well as retention properties. The results of *in vitro* antifungal activity of posaconazole against *candida albicans* inferred that the microemulsion based gel is more efficacious in contrast to microemulsion and conventional gel. Furthermore, the formulations were found to be non-irritant. Hence, the prepared formulation (microemulsion based gel) could be used effectively for the treatment of cu- taneous fungal infections effectively.



## HUMAN AND ANIMAL RIGHTS

No humans were used in this study, all animal reported experiments were in accordance with the standards set forth in the 8th Edition of Guide for the Care and Use of Laboratory Animals (<http://grants.nih.gov/grants/olaw/Guide-for-the-care-and-use-of-laboratory-animals.pdf>) published by the National Academy of Sciences, The National Academies.

## CONSENT FOR PUBLICATION

Not applicable.

## CONFLICT OF INTEREST

The authors declare no conflict of interest, financial or otherwise.

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## WORK-LIFE BALANCE

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### ABSTRACT

*Human beings need to work because work is a source of income that helps us to access the not only the necessities but also the comforts of life. The world is increasingly unpredictable and fast paced and technology and communication offers instant access that it is no surprise that the world of work and personal life is constantly overlapping. Work-life balance is the level of prioritization between personal and professional activities in an individual's life. The idea of work-life balance is perhaps too ideal to be attained. Technology has made physical location in defining the work-life balance redundant. The line between professional and personal life is blurring and thanks to mobile technology, cloud-based software and the proliferation of the internet employees are often 'permanently' at work. The outcome is poor work-life balance which is often reflected in stress and poor performance on both the personal and the professional fronts and marked by a general sense of dissatisfaction and unhappiness in employees. The work-life balance discussion therefore revolves around identifying ways to create a good work-life balance for employees because stressed-out employees are less productive and more likely to make errors.*

**KEYWORDS:** *work life balance, employee performance, stress, low productivity, individual and organizational strategies*

### INTRODUCTION

The fine line that demarcates work life and the personal life of executives across the world is getting blurred. The recent pandemic has made 'Work From Home' the new normal. This has resulted in the spilling of work into personal life and vice-versa which poses a huge challenge to an individual's efficacy in either area. A question that is often asked is whether work /Life balance is only a myth or is it actually possible to achieve it? Is it possible for someone to lead a meaningful life at the workplace, at home and within the community simultaneously or are they likely to breakdown and lose their own sense of well being in trying to have it all?

#### **Who is able to achieve work-life balance?**

Analyses of employees who are perceived to have succeeded in striking the balance successfully were found to share certain similarities:

- They are focused and decisive about what opportunity they want to choose and which one they want to opt out of.

- Their families are involved in and an integral part of their work decisions and activities.
- They value themselves, are aware of their self-worth and are constantly up-dating, up-skilling and up-grading themselves.
- They have concrete long term plans and a clear vision about what they want to achieve- both professionally and in their personal life.

The reality of today's business world is that work life balance is something people realize is crucial for their lives but very few are able to achieve it. The use of Technology like mobile phones, applications like whatsapp etc. result in a situation where an employee is 'always available'- both to the bosses, colleagues and subordinates when at home and to family and friends when at the workplace. The current scenario of Covid 19 has made the situation worse as 'Work From Home' (WFH) has become the norm rather than the exception. One thing is clear that both the work and the home are just as important and the two institutions must coexist,



rather thrive. This is why seeking work-life balance is amongst the most important issues for employees.

### **CHALLENGES IN THE PATH OF WORK-LIFE BALANCE**

In the pursuit of this balance, it is important to keep some important things in mind:

#### **1. The best laid plans can go awry**

People tend to ignore work/life balance until “something actually goes wrong.” It’s a reality that everything doesn’t always work out fine. There are emergencies and crises both at work and in one’s personal life. Accepting that things may not go as per plan and sometimes going along with the flow is the only way to deal with it.

#### **2. There is no one best path to success, nor is there only one path.**

“For forms of government let fools contest, whatever best administered is best”

There is no magic route to success; there are no “right” answers. It is imperative however that everyone asks himself or herself questions about priorities and choices that need to be made.

#### **3. Work-Life balance is a collective effort.**

There may be many paths to success but none of them can be walked alone. A support network is crucial both at and outside work—and members of that network must get their needs met too. You need all the support you can get—both at home and at the work place. You too need to be a team player—one who is always ready to lend a helping hand.

Interestingly, while people who exhibit a harmonious work-life balance do exhibit the similarities mentioned above yet even they feel that there is never a feeling of being in complete control. The idea of work-life balance is therefore to cope up with life’s challenges rather than aspire for an ideal life. The exigencies of life creep up unannounced—children fall sick, elders need help, a child’s annual day clashes with urgent office meetings, the list is endless. The idea is to sustain work challenges and still stay connected to family, friends and indeed to oneself.

### **IDENTIFYING BEHAVIOUR THAT LEADS TO WORK-LIFE BALANCE**

In order to develop the ability to balance work pressures with family responsibilities it is important to cultivate certain behavior patterns:

#### **1) Realize that success is a personal measure and everybody has their own version of it**

An organization enables its members to work purposefully towards a goal. Similarly individuals too must envision where they want to be after say 5 or 10 years and what according to them would be their idea of success. For some it could be enough time for family, for others it could be reaching a particular rank or position and for yet another it could mean taking home a big salary! Gender, of course, has a great impact upon how individuals perceive their success, and social conditioning may pressure women to take a step back at work but by and large most individuals want to have a bit of both—success on the personal as well as the professional front. This requires that each person learns to become aware of exactly what it is that they want in life and how they measure success. Organizations can support their employees in such awareness through sensitivity training and workshops.

#### **2) Recognize that technology can both enable and disable life**

Technology has pervaded lives and it is critical in today’s world. In order to achieve work-life balance individuals must decide when, where, and how to be accessible for work and organization structures and processes must support the personal –professional boundaries. The struggle to be at two places at the same time results in not doing justice to either. Technology is a good servant but a bad master. Human resource policies should be formulated in such a way that employees are available but not *too* available to their work team. It goes without saying that there should not be any compromise on work efficiency.

#### **3) Work towards building and sustaining support networks**

Executives across the board realize that for work-life balance to become a reality a strong network of behind-the-scenes supporters is critical. At home it could be a supportive spouse, a family member, a close friend or paid help. At the workplace it could be an understanding boss, a helpful team member or an efficient assistant. Support may come in the form of help with routine tasks like picking up kids from school, or cooking to listening to a rant during an emotional crisis. Once in a while everyone needs to vent when they feel frustrated at work, or need a sounding board to bounce off ideas with a neutral audience.

#### **4) Make Traveling or Relocation plans very selectively**

Work/life balance is very often about managing time and in this global world it often means managing your



location. The jobs of spouses, the education of kids, the requirements of aging parents or other such reasons could hamper travel plans or relocation which in turn may adversely impact career growth. On the other hand travelling excessively or relocating in the pursuit of career growth may harm the balance and harmony at home. The key is in being able to prioritize which travel plans to accept and which to cut back on. Organizations must also take note of personal considerations when implementing their HR policies.

#### **5) Appreciate a Supportive Spouse and be one yourself**

Your vision for your own success must necessarily include the vision of your partner or spouse. Strong bonds with family must reflect in common goals for couples. Emotional support is the greatest contribution that a partner can make to your career but it is a two-way street and you must offer the same amount of emotional support as you expect to receive to keep your life on track. A partner's support comes in many forms: to take care of the family, to help in everyday chores, and to help make the right choices about work, travel, household management, and community involvement.

#### **6) Schedule in recreation and relaxation activities into your routine.**

Work grabs our attention and refuses to be ignored so individuals, especially women, end up compromising on activities which are relaxing. Make sure you keep such activities on your schedule and give them the time allotted to them. Happy people spread happiness...overworked; unhappy people only increase the gloom.

#### **7) Identify activities that add value to life and avoid activities that drain your time or energy**

Identify activities that you can delegate or hire someone else to take care of and focus on only the valuable ones. For example if you don't have time to cook, hire a cook but take out time to eat at least meal together with your family

#### **8) Exercise regularly.**

Schedule workout activities that increase your fitness, help you channelize your energy and keep you healthy. Spread your exercise between cardio workouts, weight training, and activities that emphasize stretching, strength and agility. Organizations can support employees in this by having their own gyms and trainers or providing memberships to their staff and encouraging physical activity.

#### **9) Celebrate the little moments, small victories keep you on track**

It is the "small wins" that keep motivation and commitment high. Every little drop contributes to the

ocean. Celebrate not only your own victories but those of others. The people around you, both at home and at the work place have a stake in your success as you have in theirs!

## **CONCLUSION**

Thus, the issue of work-life balance is so significant that it is imperative that both employees and employers need to focus upon developing and deploying strategies to reduce the imbalance between employees' work and their personal lives. We have seen that there are several steps that individuals can take towards a more harmonious work-life balance. Organizations too can support their employees in implementing many of these efforts. If this important aspect is ignored it will not only result in reduced productivity levels, low job satisfaction and high stress levels amongst the employees but it will also reduce the efficiency and effectiveness of the organization preventing it from achieving its goals.

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## METAPHOR IN FAIRY TALES

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### ANNOTATION

*This article discusses the use of metaphors in fairy-tales, the attempt to make them understandable to the reader in the process of translating from a foreign language into Uzbek, and the important role of the translator's ability to translate skillfully in the native language of how the author described the events in fairy-tales. Additionally, this is clearly shown through the given examples from fairy-tales.*

**KEY WORDS:** *context, collocation, phrase, expression, genre, fairy-tale, semantics, object, inanimate world, metaphor.*

### DISCUSSION

In general, it is assumed that the value of an expression and its status (given phrase is used literally or metaphorically) is determined by the direct context of that expression. I want to explain that such an understanding of metaphor is incomplete. In determining the status of a given phrase it is necessary to consider not only its closest context in the sentence, but also the genre of the text from which the sentence is derived.

The common view about metaphor depends on context; it is based on the fact that the rules of semantic combination of words in a particular language can always be clearly defined, and on the basis of these rules indicate whether these expressions are normal or deviate from linguistic norms [Teresa Dobrzinskaya, *Metaphor in fable* - 1973, 171-1188bb/Тереза Добрзинская, *Метафора в басни* – 1973, 171-188бб]. However, it can be shown that not only are these rules broken in order to create a metaphor, but also their meanings changed, belonging to their relative and depending on which genre the text.

To illustrate this statement, we consider a semantic phenomenon specific to fairy tale texts and of great importance for the study of metaphor. The problem of formal similarity between phrases in a fairy tale, terms and metaphors, as well as their semantic differences, were originally shaped by J. Coen.

Below we analyze the use of metaphors given in examples from fairy tales:

a) 여우는 살을 빼어 훌쩍하게 한 다음에 들어가기로 하였어요.- The fox decided to enter after *losing weight*. ("The Fox and the Vineyard")

b) 세월이 흘러 소년은 어른이 되었어요. - *Over time*, the child grew up. ("Generous tree")

v) 너의 정성에 하늘도 감동하셨구나.. "The sky must have been amazed at your kindness." ("Fish in the Ice")

g) 그리고 당신도 정직한 마음씨에 대한 보답을 받은 셈이니 좋지 않습니까? - "You have received the answer you need because of your *pure heart*, isn't it good?" ("More precious thing than a golden jar")

The above examples are taken from the fairy tales in the book "The Korean Language learned through Fairy Tales", and let us consider their analysis:

a) In Korean, the word skin that the phrase to let weight go translate to the Uzbek language is losing weight. In general, in Uzbek language uses let weight go in the sense of losing weight, which shows that there are similarities in the meaning of the Uzbek and Korean languages. Hence, the phenomena of closeness between the two languages indicate that these two languages have a fraternal relationship. b) In the example of b the phrase "flow of time" is translated into Uzbek as the over time. That is, the over time created a metaphor, resembling the rapid



flow of water. c) In the example of c the use of the phrase "the sky is amazed" in a figurative sense is beautifully expressed as the sky is amazed just as a person is amazed. g) In the example of g "pure heart" it is seen that the purity of the heart is expressed in the form of a metaphor.

Many more such examples can be cited. Or the "skyscrapers" in the fairy tales show how glorious and lofty the sultan's palaces were. Looking at the examples, we can see that their meanings are fully determined by the lexical meanings of the words in the composition. That is, in the context of a fairy tale, the meanings of the above words undergo a new interpretation - resulting in a metaphor. For example, in the phrase "Flowers swam and danced in the wind", the words "swim and dance" came in a figurative sense, not in its own sense. It is understood to be shaking and swaying in the wind. In the example of "I will become your shadow", "being a shadow" is a metaphor for becoming someone's inseparable companion in life. At this point the question arises as to why the above examples in the literary text are simple and not given in their own sense, for example, a high castle, swaying, shaking flowers and etc. The fact that a sentence expressing the same meaning comes in two different forms shows that we read simple sentences word by word and we understand and accept them on their own. In the second case, we feel a hidden meaning that has a complex semantic structure within the words. They may be derived from fairy tales and do not distract the interdependence of the text, only belong to another type of universe. And this is not the words we use in our daily lives, but it is a normal situation for fiction. The rules of combination of word meanings change as they move from text to text and are determined by non-linguistic experience. Thus, in some fairy tales, plants and inanimate objects can move and talk, in others, houses can move from one place to another, and objects can have unusual peculiarities, such as birds being made of pure gold, or the food turns to gold and it becomes impossible to eat it.

Such a change in fairy tales is also reflected in the rules of combination of meanings, it has a great influence on the behaviour of the metaphor in the text and lead to its neutralization.

First of all, before determining the degree of this neutralization and the presence of metaphor in a fairy tale, it is necessary to make a some conclusions from the above considerations:

1) The rule of the unit of expression of a language defined for the known from our daily experience is the rule of conformity of certain

language units, relative; their scope is determined by a specific type of text that is limited.

For some texts, they require restructuring and a degree of difference, follow rules that may arise from the norm, and vary from text to text.

2) A metaphor is a contextual event in several meanings: it occurs in a particular context, as well as in a particular genre context, during certain processes within a sentence. Context is not only about a particular semantic interpretation of a given phrase, but also determines whether it can be considered a metaphor in general.

3) The above-mentioned symbols include texts that determine which genre the text belongs to. In this case, the most important role is played by the elements of the genre formed within the text, which perform the function of metatext (titles, including the name of the collection, capital letters at the beginning of the text). They include a text that is interesting to us - that is, a fairy tale text. These phrases do not distract the interconnectedness of the texts, there is no need to re-establish the hidden meaning, as these are metaphors.

Thus, the metatext in fairy tales becomes known to us in the form of metaphors, phrases from other worlds and other genres to which we are not accustomed, and we can understand the text.

What does metaphor look like in fairy tales? It is clear from the above information that the use of metaphors in fairy tales is completely allowed, because the use of words in fairy tale texts differs from the established norms of language. From an ontological point of view, it can be said that the world of fairy tales is completely different from the real world. In addition, the texts of the fairy tales reflect the picture of an unusual fantasy world. In this universe, events, things, and their contents are not fabricated, even though they have undergone great changes compared to the real world, and the limits of these changes are strictly limited. It seems that it is possible to create conditions for metaphors in a limited number of texts from a fantasy world.

Metaphorical migration is only neutralized or excluded for expressions whose elements are combined according to rules that differ from the general rules. These phrases, which are incomprehensible to the everyday language experience, fit the picture of the world of fairy tales. Their special status is not discussed or interpreted, as this makes them difficult to read. In this case, the reader of the text of the fairy tale is in a difficult situation, if we are talking about the reader-researcher, and not about the ordinary reader. The genre of fairy tales shown at the beginning of the text assumes that our usual experience does not apply



when reading this text, however, we still do not know which situation in the fairy tale is normal and unusual. The reader of a fairy tale must gather detailed information about the world described in the reading process, as he must be able to correctly determine the status of the defined phrases based on it. Thus, the reading of a fairy tale is complex and uneven: every expression that contradicts our linguistic experience must be consistent with what we are reading or hidden information about the world of fairy tales, and in this world of information they must be metaphorically or originally adapted. There are also cases when the meaning of an expression can be known only by reading the continuation of the text, in which case we encounter a specific ambiguity in the meaning of the phrase. Then, it is also possible to speak of metaphorical expressions that appear to be metaphorical or meaningless in any other text. In the context of a fairy tale, the meanings of these phrases are determined on the basis of information before or after it. The final decision on the meanings of metaphorical expressions is made after the collection of important information and on the comparison of the result of two combinations of metaphorical and original meanings derived from the text, which derive metaphorical and original meaning from the text. As a result of such a comparison, if one of the compounds is omitted, the meaning of the expression is determined unilaterally.

나는 너의 그늘이었어요 - I was your shadow.

The analysis shows that the presence of metaphorical migrations in the text literally makes it difficult to read. Such expressions are a critical point in fairy tale texts because they are based on experience and understanding except from usual language, leading to a conflict in understanding the text, which depends on a specific form in a given fairy tale world. It is known that the text must contain information that prevents such expressions from breaking the interdependence of the text.

Here are a few examples:

The mermaid raised her white and soft hands, walked on tiptoes, and *swam lightly in the air*. ("Mermaid")

The mermaid's successive actions, her preparation for "swimming" (at the moment described, she is no longer a mermaid because the mermaid has no legs), the prince's palace is a palace on ordinary land, where there is a celebration in honor of the master - all the evidence shows metaphorical application is given here. The metaphor is related to the previous context. To cite another example from the same tale: ... *his eyes spoke to his heart* more than the songs of all slaves. It is clear from the previous context that in such a

case the eyes are not independent beings who can speak, and we can see the metaphor here.

In Andersen's fairy tale of "Old House", we come across the following dialogue:

They talk about your completely loneliness in our house! - said the boy.

O! Memories always *chase me* ... They always *bring familiar faces and images* with them! ...

The phrase that *chase me* can be understood in its original and metaphorical sense, as the previous context helps to assimilate both meanings. The child understands it in the original sense. This is shown in his conversation with the alone soldier:

Yes, - said the boy. - I think it's great; after all, memories take a look here and bring so many familiar faces with them! ("Old House").

At the beginning of our article, we mentioned that the difference between the world of fairy tales and the real world is reflected in the non-standard rules of word combination. Thus, the metaphor in fairy tales is a rare phenomenon, or it always depends on the context and constantly requires the author and the reader to consider the combination of semantic situations. Such an unstable state of metaphor in fairy tales can be explained by changes in the shape of the described universe, as well as the resulting rules of word combination, when compared with other genres (if we consider the semantic-communicative conditions and move away from the genetic specificity of the genre). The ontological change and weakening of these stable lexical connections is served by metatext information that transforms a given text into a fairy tale. The amount of such information may change depending on the specific text; in fiction it may be limited to the subtitle "Fairy Tales" or implied directly in the author's name.

I think that the method of interpreting the above fairy tale texts can also be used in the analysis of some types of poetic texts. Thus, there are so many unusual phrases in the poetic text without any explanatory commentary that it can be interpreted as a metaphor or a true description of the peculiar fairy-tale-poetic world.

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# BREAKING THE CHAIN: HOW KERALA EFFECTIVELY HANDLED THE LEVIATHAN COVID CRISIS

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## ABSTRACT

*The first positive case of Novel Coronavirus Disease (COVID-19) was reported in Kerala. The state with over a population of 35 million has reported 4189 cases of COVID-19 as on 30 June 2020. The reports said that 23 mortality with an impressive recovery rate of 51.7%. Kerala government's prompt response to COVID-19 can be attributed to its experience and investment made in emergency preparedness and outbreak response in the past during floods in 2018 and especially, the NIPAH outbreak in 2019. The state followed new methods, ideas and approaches and its experience in virus control. It is possible due to active surveillance, setting up of district control rooms for monitoring; capacity-building of frontline health workers, risk communication and strong community engagement, and addressing the psychosocial needs of the vulnerable population are some of the key strategic interventions implemented by the state government that kept the disease in control.*

**KEYWORDS:** Kerala, Corona virus, COVID-19, Pandemic, Health workers, Doctors

## INTRODUCTION

While the world has been engaged in an uphill battle against a terrible pandemic, an unassuming state, from the southern part of India, geared up for battle. The state of Kerala has been a shining example in the war against COVID-19<sup>1</sup>. "The battle has been won, but the war isn't over". This is how the Chief Minister of Kerala, Shri Pinarayi Vijayan concluded his statements in an interview to a leading national news channel<sup>2</sup>. The success Kerala has had in tackling COVID-19, has been appreciated, both on national, as well as international fora. But Kerala isn't resting on its laurels. As we speak, the state is finding new challenges, due to the heavy influx of its citizens, based abroad. This massive influx is partly due to the confidence that Keralites have in their own state. Rome wasn't built in

a day. The same can be applied to Kerala's health and education infrastructure. Kerala has a high literacy rate of 93.91%. Kerala boasts of high socioeconomic indicators when it comes to education, health, income being generated, life expectancy and health status. The investment made from the inception of the state has borne fruit, through the many adversities faced by the state. This, along with the diligent nature of the Keralite professional, and the caring, compassionate persona of the average Malayali, Kerala, has been successful in "flattening the curve", and has led us to use the term "Kerala Model" for handling public-health emergencies<sup>3</sup>. Despite being the first Indian state to report a case of COVID 19, Kerala has found its place among the states of India, with the most recovered



patients, and the least deaths. The state's fatality rate stands at 0.53%, which is the lowest in India<sup>4</sup>.

### **FORMULA FOR SUCCESS**

Kerala's formula for success has been straightforward. The honorable Health Minister, Mrs. K.K. Shailaja, and her team have been ahead of the curve. They had moved their wheels into action since they got to know of this upcoming virus, way back in January<sup>5</sup>. Their principles of identify, investigate and isolate have found resounding success. This is the one state in India where the R0 has been contained well, due to extensive testing, contact tracing and a humane quarantine for infected people, way before the national lockdown was announced. Kerala has rigorously screened all arrivals at its four international airports, and immediately hospitalized or quarantined suspected cases. They have installed thermal cameras, and on site health personnel, to effectively identify individuals, and provide targeted, humane treatment<sup>6</sup>. The state established its unique outlook for having allocated significant resources to public-health infrastructure, devolved power and funding to village-level bodies, and established a social system that promotes community participation and public cooperation. Kerala initiated a war on the virus, when it shut down educational institutions, regulated traffic and barred public transport. Due to the request from the Chief Minister, the residents of Kerala went into effectively social distancing themselves, and staying back home on their own accord. This unique symbiotic relationship between the government and its citizens saw the drop in infections, thereby making the "Kerala Model" a success<sup>7</sup>.

### **QUARANTINE EFFECTS**

Kerala was able to impose its quarantine efforts far more effectively than other states have. When its citizens came under home quarantine, the police promptly delivered what people needed. The government released its own app to combat fake news and statistics, and to provide information directly to the people. An increase was seen in the rations supplied, with stores of good quality grains, and food kits provided, to ensure that no one would go hungry. Kerala had also announced a comprehensive economic relief package for citizens in need<sup>8</sup>. Kudumbashree, a grassroots network of local organizations and women's self-help groups, has helped the state's containment strategy by producing two million masks and 5,000 liters of hand sanitizer in the first month of the national lockdown. Some 1,200 community kitchens were

established to feed the indigent and unemployed, and Kudumbashree has already served 300,000 meals a day. The "Break the Chain" initiative has found to be one of the main success stories<sup>9</sup>. Kerala took care of its migrant labourers as well. They were provided with relief and places to stay when the going got tough. The term "migrants" was replaced by "guest workers". This simple gesture was considered a blessing, and a testament to Kerala's outlook of "nobody gets left behind"<sup>10</sup>. Kerala tried to allay their fears when migrant laborers became uneasy, and were provided free accommodation and food, and urged to wait in place. These instructions were delivered in migrants' own languages, and duly followed. Kerala sent its "guest workers" in good health, by providing them with kits of food, water, and a coconut sapling as a reminder of the state they spent their efforts in<sup>11</sup>. The state has effectively quarantined and controlled the massive spread of COVID-19, and with time, it has engaged in the concept of "reverse quarantine". Aggressive testing and localization of cases, without providing a load onto the existing system has been taken care of quite well. Kerala, along with its organized army of health care workers, has a battalion of citizen health volunteers. Their care has also been organized with almost Rs. 3,00,000 offered as insurance<sup>12</sup>.

### **THE WAY FORWARD**

However, the war has not been won. Kerala is facing another uphill battle since the NRI's and out of state citizens have arrived. Even though the state has provided excellent food and quarantine measures for them, even more folks are yet to arrive. The lack of testing of the foreign countries and states has resulted in a spike in cases. An efficient and robust system needs to be maintained. For this, the state will need to tighten its belt and get things done. The Kerala state must invest more in its health and delivery systems<sup>13</sup>. A strong scientific backbone must be built up. Therefore, Kerala needs to invest more into its research and development wings. There must be more research grants, offered to the traditionally brilliant and resourceful brainpower. Entrepreneurship and fast track think tanks must be given priorities. Sanitation and health drives need to be increased. More importantly, the civic duties of citizens must be instilled. Efficient garbage and waste disposal systems need to be developed. The drainage system must also be revamped, as it could become the foundation to many vector borne illnesses. A more public interest must be taken into the health education sector, and the government needs to build more infrastructures, so as



to strengthen its existing medical colleges into centers of excellence<sup>14</sup>. Kerala has built its results on strong bedrock of its traditions. Decentralized governance fraternity, equality, trust, accountability, transparency, public trust and governmental accountability. It offers a model that is humane, trustworthy and most importantly, reproducible<sup>15</sup>.

## CONCLUSION

The Kerala state set guidelines to manage the virus spread. In India all other states followed the Kerala to control the virus spread.

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# **EFFECT OF NURSE-LED HEALTH EDUCATION ON POST TRAUMATIC STRESS SYMPTOMS AMONG INTERNALLY DISPLACED PERSONS IN JOS, NORTHERN NIGERIA**

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## **ABSTRACT**

**Introduction:** Internal displacement occurred due to armed conflict or other forms of disasters; it was associated with the development of Post-Traumatic Stress (PTS) symptoms. The available interventions for PTS might be costly or not affordable for people in distress in low resource settings; hence, the need to explore alternative options. This study investigates the effect of a nurse-led health education intervention package on PTS symptoms among Internally Displaced Persons (IDPs). We hypothesised that 'there is no statistically significant difference in PTS symptoms scores among IDPs before and after intervention with nurse-led health education.

**Methods:** A quasi-experimental design was employed for the study. Post-Traumatic Stress short-form scale (PTS-8) was used as an instrument for data collection. Data were analysed using SPSS version 23. The socio-demographics are presented in simple percentages and tables. Unpaired student t-test was used to determine the significant differences among variables of interest in the hypothesis generated.

**Results:** Most common PTS symptoms identified among the IDPs included recurrent memories with means and standard deviations (M 2.92, S.D 0.778); nightmare/sleep disturbance (M 2.26, SD 0.853) and feeling jumpy, easily startled and fearful (M 2.20, SD 0.969). Nurse-led health education caused a reduction in PTS symptoms severity. There was a significant difference in the PTS symptom scores before ( $2.3 \pm 1.7$ ) and after ( $1.7 \pm 0.7$ ) the intervention with a score of 2.37,  $p=0.020$ .

**Conclusion:** The nurse-led health education practised in undeveloped nature modified environment reduced PTS symptoms severity among the IDPs. It should be used as a tool for reducing the symptoms of PTS among IDPs, especially in contexts that are deficient in already developed recreational and traumatic stress healing facilities.

**KEYWORDS:** *Posttraumatic stress, Nurse-led health education, internally displaced persons.*



## BACKGROUND

Internally Displaced Persons (IDPs) are compelled to escape their home yet stay inside their nation's jurisdiction (Mooney, 2005). They are frequently alluded to as evacuees, even though they don't fall inside refugees' legitimate meanings (Owoaje et al., 2016). As reported by the United Nations High Commissioner for Refugees, there was an increasing number of IDPs globally secondary to armed conflict with an estimated 65.6 (Morina et al., 2018). Displaced persons were commonly found in Ethiopia, Syria, Afghanistan, Democratic Republic of Congo, and Burkina Faso (Internal Displacement Monitoring Centre, 2020). Africans were the predominant population (Owoaje et al., 2016). Mental health problems were among their numerous problems (Haagen et al., 2017).

Posttraumatic stress (PTS) resulting from exposure to a traumatic event(s) such as war, terrorist attack, rape, hurricanes, fatal accidents, and flood are increasingly becoming public health concern globally (Roberts et al., 2019). These everyday traumatic experiences are evident in contemporary times and are categorised as either, human-made or natural disasters (Brooks et al., 2019; Lewis et al., 2019). Human-made and natural disasters such as armed conflicts, chemical spills, air and road accidents are well known to have resulted in much destruction and displacement (Klaus & Pachocka, 2019; Marshall et al., 2020; Zhang & Zhang, 2019). Over the past ten years, there has been a significant shift in the attention given to traumatic events on individuals, families, and communities (Hu et al., 2019; Satkoske et al., 2019). Traumatic stress, and posttraumatic stress mainly, have gained International prominence as conditions that affect people across the globe in the wake of exposure to extreme life events, be these collective or individual and therefore calls for attention from all and sundry to help decrease it (Sepahvand et al., 2019; Spialek et al., 2019). In recent years, Nigeria had experienced series of disasters and catastrophes which are mostly human-made such as insurgency, terrorist attacks, and civil strife including religious and communal conflicts (Ede, 2019; Olanrewaju et al., 2019). Other natural calamities like flood, desert encroachment and landslides have led to an increase in the number of Internally Displaced Persons (IDPs) in the Northern part of Nigeria, including Plateau State (Michael Ihuoma, 2019; Olanrewaju et al., 2020). The prevalence of PTS among IDPs in the community was 46.1% in Plateau state (Ellis et al., 2019; Tagurum et al., 2014). Severe exposure to violence can produce PTS (Ellis et al., 2019; Fingerle & Wink, 2020). Other studies have also shown a significant relationship between exposure to violence and the development of PTS comorbidities (Muir et al., 2019; Siriwardhana et al., 2019). In Africa, there is a high

prevalence of PTS and lack of suitable intervention that is cost-effective, unlike what is found in the developed nations.

PTS symptoms were managed using the drug (pharmacological), and non-drug (non-pharmacological) approaches (de Moraes Costa et al., 2020; Mavranetzouli et al., 2020). The non-pharmacological approaches such as Eye movement desensitisation and reprocessing (EMDR), Cognitive behavioural therapy (CBT) and group therapy were found to be effective (Bisson et al., 2020). However, these interventions might be challenging to implement among IDPs in Africa due to lack of purchasing power for drugs, the need for local adaptation of the interventions, and a trained specialist. Psycho-education might promote individuals coping with mental health problems. Review evidence has shown that it was useful for stress reduction ( $d=0.27$ ) (Van Daele et al., 2012). Hence, the need to utilise locally developed content using the resources that might be culturally acceptable. Therefore, this study was designed to assess the effect of a nurse-led health education linkage on posttraumatic stress symptoms among internally displaced persons. We hypothesised no statistically significant difference in PTS symptoms scores among the study population before and after intervention with nurse-led health education.

## METHODS

A quasi-experimental design was employed in this study. A single group pre-test/post-test design was used (Polit et al., 2006). To examine the need for enlightenment on PTS and empowerment with coping strategies among the IDPs, a Focus Group Discussion (FGD) was conducted among four (4) individuals (IDPs). The information generated via a questionnaire (PTS-8) and the FGD before intervention (pre-test) guided the preparation of the nurse-led health education intervention package delivered through 7 sessions of 50 minutes each.

The contents of the Intervention package included coping skills and strategies like breathing retraining, drop-three (jaw, shoulders and the stomach), grounding and safe place exercises using lecture-discussion and demonstration methods of teaching and learning. Alongside the FGDs, baseline data were obtained from the recruited participants. Ethical clearance was obtained from Plateau state Specialist Hospital, Jos, Plateau state, and House of Recab.

## PARTICIPANTS

The IDPs, made up of men and women, were displaced due to ethnoreligious conflicts from the affected local government areas like Jos south and North, Riyom, Shendam. Some came from neighbouring states like Bauchi, and the most



enduring and prevalent ones are from Gwoza area of Borno State of Nigeria displaced by the Boko Haram insurgency. Most of these people are farmers, while few are traders and civil servants. Almost all of them understand and can speak the “Hausa” language. Plateau state had approximately 250,000 registered IDPs in camps (Adamu & Rasheed, 2016). However, most of these IDPs still left the camps and got integrated into various communities. Subjects are considered eligible for inclusion in this study if: (1) they are male or female IDPs, (2)  $\geq 15$  years, (3) residing in the House of Recab IDPs camp without a history of mental illness before exposure to violence, or traumatic events. Those excluded from participation were those (1) whose ages were below 15 years, and (2) those who refused to participate in the study, and of course, (3) those who had notable mental health challenges before the current traumatic incidents under consideration.

The displaced persons lived in camps and their families (Uzobo et al., 2018). They were supported by government and non-governmental organisations for aids in security, shelter, foods, healthcare, water, and education (Uzobo et al., 2018). The study setting is the House of Recab IDPs Camp in Jos, Plateau State of Nigeria

A total of 50 subjects residing in House of Recab were recruited. We employed the convenience sampling technique in recruiting male and female subjects 15 years and above, without the history of mental health challenges before traumatic events that led to their internal displacement who consented voluntarily to participate in the study.

### **Interventions**

Nurse-led health education package is a seven-session package; each lasting for 50 minutes of instructional interactions and 60 minutes of practical exercises. The first session of the package is on common reactions to trauma, PTS and its symptoms, the second deals with coping skill of breathing retraining to reduce tension, third are on drop-three, fourth on grounding, while the fifth deals with two words best-self statements and orderly use of tools, i.e., breathing, calming phrases, and best-self statements. Sessions six and seven are on assertion, acceptance and serenity prayers. It is practised in undeveloped nature modified environments or settings, hence developed stress relieving, recreational facilities are lacking in Jos, and alternative strategies need to be explored. The lecture-discussion, demonstrations, and review of assignments were held on Saturdays. even weeks.

Four (4) nurse research assistants who consented to participate in the study were recruited conveniently without blinding from the Plateau Specialist Hospital Jos. They were recruited and trained for five days for sound orientation for

effectiveness in interaction interviewing. Four (4) weeks were used in all, for data collection. Through the camp leadership, formal access was gained to the IDPs who consented to participate in the study and, signed an informed consent form. Baseline data were collected before the intervention. The FGD was made up of 4 discussants. The discussions were held in a safe and quiet place in Jos city, conducted by the principal investigator and four nurses using a questionnaire guide to direct the conversations. One nurse took notes, another audio-recorded the discussions, which were edited and transcribed by two nurses immediately after the sessions. The intervention was then administered on the participants for seven (7) weeks after which post-test (T2) data were collected after two weeks post-intervention.

### **The specific objectives of the study are to:**

1. Describe demographic characteristics of participants (IDPs).
2. Identify the most common PTS symptoms experienced by the study IDPs.
3. Determine the nurse-led health education intervention package's effect on the IDPs' most common PTS symptoms.

### **Procedure and instruments for data collection**

The demographic data (i.e., gender, age, marital status, levels of education, and occupation) and clinical data (i.e., PTS symptoms) were collected at baseline and post-intervention by trained research assistants.

Hausa version of the PTS-8 was used for data collection. It is an adapted instrument from Standardised Post Traumatic Stress Short-formed-scale derived from Harvard Trauma Questionnaire (HTQ) designed by Harvard programme in refugee trauma at Massachusetts General Hospital for symptomatic posttraumatic stress with four intrusive items (B1, B2, B3, and B4 and B5 combined), two avoidance items (C1 and C2) and two hyper-vigilance items (D4 and D5) and answered on 4 points Like t- type scale with the cut – off means of 2.20 as against 3.50 since the focus is not on the diagnosis of the disorder but symptomatic posttraumatic stress (Hansen et al., 2010). PTS-8 was psychometrically tested, and it shows a two-factor solution with one of the models having a dysphoria factor correlated with anxiety and depression (Hansen et al., 2010). Most importantly, the instrument appears to have good psychometric properties on victims of disaster, rape and whiplash patients (Hansen et al., 2010). Its test-retest reliability co-efficient was satisfactory (Hansen et al., 2010).



The instrument was translated into Hausa following the international recommendations, and was found to be reliable with Cronbach alpha of 0.83, the level of significant was put at  $< 0.05$ .

### METHODS OF DATA ANALYSIS

Data were analysed using the Statistical Package for the Social Sciences (SPSS version 23). Data obtained were analysed quantitatively and qualitatively, and presented in percentages, narrative form and tables, using inferential statistics. Unpaired

Student's t-test was used for the analysis of the hypothesis generated. FGD analysis was thematically done with central themes and sub-themes. Major themes included Internal displacement, Traumatic events, Experiences and Daily activities affected. Sub-themes included Knowledge deficit about PTS and Coping skills, demand for empowerment with coping strategies for utilisation. This enhanced motivation for the study and focused on the content of the Nurse-led health education package.

### RESULTS

Objective One (1): Social-demographic characteristics of participants

**Table: 1: Socio-Demographic Description of Participants**

S/N	Items	Frequency(f)	Percentage (%)
1.	Age		
	15-20 years	31	62.0
	21-25 years	7	14.0
	26-30 years	5	10.0
	31-35 years	2	4.0
	36-40 years	1	2.0
	41 and above years	4	8.0
	Total	50	100
2.	Gender		
	Male	24	48.0
	Female	26	52.0
	Total	50	100
3.	Marital Status		
	Married	20	40
	Single	30	60
	Divorced	--	--
	Widowed	--	--
	Total	50	100
4.	Educational Level		
	Non formal education	11	22
	Primary education	11	22.0
	Secondary education	1	58
	Tertiary education	50	2.0
	Total		100
5.	Occupation		
	Civil servant	2	4
	Trading	2	4.0
	Artisan	1	2
	Unemployed	5	10.0
	Farming	25	70.0
	Others	5	10.0
	Total	50	100

**Table 1** above describes the socio-demographic characteristics of the respondents. A total of 50 internally displaced persons (IDPs) participated in this study. The age distribution of the respondents reveals that 31(62.0%) of the respondents were between the ages of 15-20 years, 7(14.0%) were between the ages of 21-25 years,

5(10.0%) were between the ages of 26-30 years, 2(4.0%) were between the ages of 31-35 years, 1(2.0%).

**Objective two:** Identify the most common PTS symptoms experienced by the study IDPs.

As shown in Table 2, the experiences of the IDPs in mean scores are identified. The most



common and severe symptoms among the IDPs are the recurrent thought or memory (62%) which led to weakness, sadness and loss of appetite, followed by Recurrent nightmare/dream (56.5%) about the events

leading to fear and sleep disturbance at night. After these, the third symptom is easily startled, feeling jumpy and fearful with various mean scores of 2.92, 2.26 and 2.20, respectively.

**Table 2: PTS symptoms experienced by the IDPs (N=50)**

S/N	Items	Not at all 1		Rarely 2		Sometimes 3		Most of the time 4		Mean	Standard deviation
		F	P%	F	P%	F	P%	F	P%		
1.	Recurrent thoughts or memories of the event(s) which results in weakness, loss of appetite and sadness.	2	4.0	11	22.0	26	52.0	11	22.0	2.92	0.778
2.	Feeling as though the event is happening again, culminating in fear.	10	20.0	24	48.0	14	28.0	2	4.0	2.16	0.792
3.	Recurrent nightmares/dreams about the event(s) making me afraid of the night or the sleep.	11	22.0	17	34.0	20	40.0	2	4.0	2.26	0.853
4.	Sudden emotional or physical reactions when reminded of the events, e.g. sweating, loss of appetite, headache and running stomach.	21	42.0	19	38.0	8	16.0	2	4.0	1.82	0.850
5.	Avoidance of the crowd and loud noise.	17	34.0	21	42.0	10	20.0	2	4.0	1.94	0.843
6.	Denials of thought or feelings associated with the sad event and feeling moody.	11	22.0	25	50.0	11	22.0	3	6.0	2.12	0.824
7.	Feeling jumpy, easily startled and fearful.	13	26.0	20	40.0	11	22.0	6	12.0	2.20	0.969
8.	Feeling of being on guard, anxious and feeling of danger.	13	26.0	25	50.0	6	12.0	6	12.0	2.10	0.931

**Objective Three:** Determine the nurse-led health education intervention package's effect on the IDPs' most common PTS symptoms.

Table 3 showed the scored means and grand means of PTS symptoms before and after intervention with nurse-led health education. Before

the intervention, the grand mean scored through PTS-8 was 2.3, which got reduced to 1.7 two weeks after intervention. This implies that the intervention reduced the PTS symptoms.

**Table 3: Effect of intervention on PTS symptoms among IDPs (N= 50) ( PTS-8 )**

SN	Symptoms Items	Pre-test	Post-test	2weeks
		M±SD.	M±SD	
1.	Recurrent thoughts or memories of the event(s) result in weakness, loss of appetite and sadness.	2.9±0.8	2.2±0.7	0.76
2.	Feeling as though the event is happening again, culminating in fear.	2.2±0.8	2.0±0.5	0.20
3.	Recurrent nightmares/dreams about the event(s) making me afraid of the night or the sleep.	2.3±0.9	1.8±0.8	0.48
4.	When reminded of the events, sudden emotional or physical reactions, e.g. sweating, loss of appetite, headache, and running stomach.	1.8±0.9	1.6±0.7	0.26
5.	Avoidance of the crowd and loud noise.	1.9±0.8	1.7±0.6	0.26
6.	Denial of thought or feelings associated with the sad	2.1±0.8	1.8±0.7	0.28



event and feeling moody.

7.	Feeling jumpy, easily startled and fearful.	2.2±1.0	1.8±0.7	0.40
8.	Feeling of being on guard, anxious and feeling of danger.	2.1±0.9	1.84±0.68	0.26
	Grand mean	2.3±1.7	1.7±0.7	

PTS symptom scores among the study population before and after the intervention

**Null hypothesis:** There is no statistically significant difference in PTS symptoms scores among the

population studied before and after the intervention with nurse-led health education.

**Table 4: T-test analysis of IDPs PTS symptoms (N=50)**

S/N	Symptoms Item	Pre-test M±SD	Post-test M±SD	T	p-value
1.	Recurrent thoughts or memories of the event(s) result in weakness, loss of appetite and sadness.	2.92±0.78	2.16±0.65	5.293	<.001
2.	Feeling as though the event is happening again, culminating in fear.	2.16±0.79	1.96±0.53	1.487	.140
3.	Recurrent nightmares/dreams about the event(s) making me afraid of the night or the sleep.	2.26±0.85	1.78±0.76	2.977	.004
4.	When reminded of the events, sudden emotional or physical reactions, e.g. sweating, loss of appetite, headache, and running stomach.	1.82±0.85	1.56±0.67	1.699	.093
5.	Avoidance of the crowd and loud noise.	1.94±0.84	1.68±0.55	.142	.070
6.	Denials of thought or feelings associated with the sad event and feeling moody.	2.12±0.82	1.84±0.71	1.825	.071
7.	Feeling jumpy, easily startled and fearful.	2.20±0.97	1.80±0.70	2.365	.02
8.	Feeling of being on guard, anxious and feeling of danger.	2.10±0.93	1.84±0.68	1.596	.114
	Overall	2.3±1.71	1.7±0.65	2.37	.020

The comparison between pre and post-test scores of PTS symptoms generally showed that the post-test scores were lower than the pre-test scores. The differences were however significantly observed in these symptoms: recurrent thoughts or memories of the event(s) which results in weakness, loss of appetite and sadness ( $p=0.001$ ), frequent nightmares/dreams about the event(s) making IDPs afraid of the night or sleep disturbance ( $p=0.004$ ) and feeling jumpy, easily startled and fearful ( $p=0.020$ ). The result also showed a significant difference in overall PTS symptoms score before and after intervention with nurse-led health education ( $p=0.020$ ), all these at  $P<0.05$  (See Table 4)

## DISCUSSION

Nurse-led health education has reduced the severity of PTS symptoms among the IDPs in camps in Jos, Plateau state. This finding corroborates with the outcome of the work of Richard Shaw, Nick, Lilo, Booil, William, Stevenson & Horwits (2014) who evaluated the effect of an intervention programme with health education content aiming at the reduction of Post-traumatic stress symptoms among 105 traumatised mothers of preterm infants

which significantly resulted in PTS symptom reduction.

The intervention study on effect of health education program among 100 female nursing students at Benha University, Egypt by Eman, Ramadan & Hanem, (2015) utilizing quasi experimental design and a convenient sample evaluated the effect of health education program on academic stress in the students second and third years and concluded that the program had positive effect in reducing stress symptoms in the study group after the program. In Washington, Dworkin and Schumacher (2016) conducted early intervention study on victims of assault to prevent the development of PTS and concluded that interventions that are perceived positively were associated with lower PTS symptoms. They suggested further, that best practices interventions be carried out, rather than simply encouraging survivors to seek help. Other authors have also attested to the efficacy of health education interventional programs which are problem focussed as being good enough for PTS symptoms reduction, (Falex, 2012).

In October 2014, the coordinator of Outreach, Screening and Intervention for Trauma (OSITA) which is an innovative program that aims at



improving the mental health and socio-economic condition primarily for vulnerable Internally Displaced Women (IDW) reported the outcome of their studies that, internally displaced women had received screening and psych-education; and those with high stress scores experienced less stress and improvement afterwards ( Gomez, 2014).

In conclusion, we submit that there was evidence of a reduction of PTS symptoms at post-intervention. Notably, Nurse-led Health Education resulted in a significant decrease in recurrent thoughts or memories of the events, frequent nightmares/dreams, feeling jumpy, easily startled and fearful as the hypothesis generated and tested indicated in the context of this study, corroborating with similar studies cited in the report (Shaw, et al, 2014; Ramadan, 2015 ). To our knowledge, this is the first study investigating the effect of Nurse-led Health Education on Post Traumatic Stress Symptoms among Internally Displaced Persons, in Jos, Northern Nigeria.

The weakness of this study, may be thought of, and in terms of its setting and limited number of the IDPs studied ( 50 IDPs ), thus probably affecting its external validity of results generalization, globally.

We suggest that similar studies of wider scope prospectively be carried out to ascertain sustained effect of nurse led health education on IDPs.

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# MORPHOLOGY AND NATIONAL-CULTURAL FEATURES OF MEDICAL TERMS RELATED TO COLOR IN THE UZBEK LANGUAGE

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## ABSTRACT

*This article, first of all, discusses the approach to medical terms as phenomena interrelated with language culture and speech culture, the morphology of medical terms related to color in the Uzbek language and their national-cultural features.*

*In particular, the article provides a comprehensive and convincing explanation of the etymology and national-cultural aspects of medical terms (linguoculturology) based on the method of microanalysis. For example, when the author analyzes the term "ko'kyo'tal" (whooping cough) as a component, he divides it into parts such as "ko'k" (green) and "yo'tal" (cough), focusing on several semantic fibers of the word "green" and their specific connection with the word "cough". Comparing the name of this disease and its origin with other languages, including Russian, the specific ways of word formation in the Uzbek language are noted.*

**KEYWORDS:** *term, linguoculturology, component, semantics, morphology, equivalent, etymology, communication, nomination, infection, virus, immunity, tissue, lexeme, sema, semema, medicine.*

## THE URGENCY OF THE SUBJECT

It is known that Uzbek folk medicine has its own ancient and national-cultural traditions. So far, the process of historical and cultural changes and renewals that have taken place and continue to this day, naturally, first of all, is reflected in the lexicon of our language. That is, in connection with the development of society, in the emergence of new words, concepts and terms, including medical terms, the Uzbek language appears as a unique cultural center.

The vocabulary of the Uzbek language - terminology includes several medical terms related to color, which have their own history of origin, ie etymology, national-cultural features and morphology of word forms that differ from other languages.

The study and research of medical terms in the Uzbek language into such separate groups is becoming increasingly important today.

## METHODOLOGY

Systematic, historical and synchronous analysis, structural and component analysis, content analysis,

logical and comparative-descriptive methods were used in the research process.

## EMPIRICAL ANALYSIS

The Uzbek language is an invaluable treasure of the Uzbek people, the basis of its spirituality and culture.

As the President of the Republic of Uzbekistan Sh. Mirziyoyev noted, **"In the context of globalization, the preservation of the purity of our national language, increasing its vocabulary, creating Uzbek alternatives to modern terms in various fields, ensuring their uniform use is an urgent task"**.<sup>1</sup>

Therefore, the Resolution calls for further expansion of the use of the Uzbek language as the state language in the education system of the country, the transformation of our native language into an active means of communication and interaction at the

<sup>1</sup> Mirziyoyev Sh. Khalq so'zi newspaper. // October 21, 2019. "Speech at the ceremony dedicated to the 30th anniversary of the status of the Uzbek language."



international level, Important tasks such as increasing the love and interest of our young children in the Uzbek language, as well as the correct systematization of scientific terms and concepts in the language and their widespread application in practice.

Every science or field has the term network, which is used within that science, field or network, more precisely, it shapes the speech of the owner of the profession, creates conditions for mutual speech communication.

Each language has certain dimensions and specific national-cultural features in reflecting a reality. These features determine the cultural level of the language - the scope of linguoculturology. In particular, the study of national and cultural features of medical terms at the language level, in particular, within the lexical, morphological and etymological sections of the language, is one of the most important tasks today.

It should be noted that people with a particular profession or specialty often work with specific terms specific to a particular industry. For example, while economists use terms such as commodity, clearing, rent, marketing, management in their written or oral speech, it is natural for medical professionals to use terms such as infection, syndrome, allergy, hypertension, gastritis, hepatitis, diagnosis, symptom.

In particular, the in-depth study of medical terms in our language in terms of semantic features, analysis and interpretation of semantic migration and new categories of meanings in them, informing the general public about the scope of application is of great importance today.

When considering the linguoculturological features of medical terms in the Uzbek language, the approach to terms as phenomena interrelated with language culture and speech culture plays an important role in clarifying many issues, including the semantic and historical-etymological development of language terms. Because each language serves as a direct bridge between the people who speak this language as a means of communication, the transmission of the people's centuries-old history, culture, customs, spirituality and values from ancestors to generations, from past to future.

In this regard, language is not limited to time and space, that is, certain information is transmitted and reached at any time, anywhere through language. From this point of view, each language serves as a unique communicative and nominative source that preserves the national experience and cultural heritage, clearly reflects the historical and cultural events and the processes and ways of their development.

The following scientific and theoretical sources of Russian linguistics confirm our opinion:

“Each culture selectively reflects certain representations of universal thinking”<sup>2</sup>, “There are objects or events that are fixed in all forms of texts, both

general and abstract in syntax, due to the long duration in the social context of language, as well as the relationship between object and event”<sup>3</sup>.

The genesis, structure and semantics of medical terms in the lexicon of the Uzbek language are different and have undergone a certain process of formation.

Among the medical terms used in the Uzbek language dictionary, color-related lexical units make up a certain percentage. In the emergence of medical terms related to color, first of all, the clinical symptoms of the disease, its appearance, and then the public opinion about the occurrence, period, consequences of the disease play an important role.

Below we consider the morphology, lingvoculturology of the Uzbek language and their specificity in the emergence of color-related medical terms, as well as the linguistic processes that lead to the naming of diseases in relation to color.

**Ko'k yo'tal (Whooping cough)** – acute infectious disease<sup>4</sup>. It is accompanied by a series of severe coughs. Stimulated by bacteria in the form of short rods. When a sick child sneezes or coughs, small sputum and mucus droplets from the air enter the body of a healthy child through the respiratory tract (airborne infection). The disease can be transmitted only when walking close to the patient, because the causative agent of pertussis is resistant and dies immediately outside the body. In practice, the disease is not transmitted through the surrounding objects. It is most common in children aged 1-5 years, and sometimes occurs in children under 1 year of age.

The whooping cough pathogen can remain in the child's body for 2-15 days without any symptoms (incubation period). Then the child begins to cough. The period of coughing is the main and persistent symptom of the disease, the cough begins with two or three severe coughs, then the patient coughs incessantly, shortly, and falls into the breath, making a "screaming" sound as a result of shortening of the vocal cords. Then he coughs again and again. The severity of the disease depends on how long the cough lasts and how long it lasts. In infants, the cough lasts a long time (2-3 minutes), they breathe without making a squeaky sound and cough briefly. When a child coughs, his face first turns red and then gets blue. Tears may flow, blood may flow to it, the tongue may hang down, and the veins in the neck may swell.

*The term Ko'k yo'tal (whooping cough) consists of the words ko'k and yo'tal, i.e. ko'k is the original quality that means color and yo'tal is an abstract name that means the name of a disease.* Today, the term ko'kyo'tal (whooping cough) is used in the Uzbek language from the point of view of lingvoculturology, and is used in this sense to refer to a disease based on cough, getting blue in the body, swelling of the neck veins, ie sound different from other coughs. The disease is named

<sup>2</sup> Sayaxova L.G. Linguoculturology. Ufa: 2006.

<sup>3</sup> Maslova V.A. Introduction to cultural linguistics. Moscow: 1977.

<sup>4</sup> Encyclopedia of Health. Tashkent: "Matbuot" - 1983, 234-p.



according to the patient's appearance, color symptom. Although blue is one of the symptoms of the disease, but here it embodies the general name of the disease and is widely used in medicine today.

The great thinker and scholar Alisher Navoi, who made a great contribution to the development of the Turkic language, in his work "Muhokamatul lug'atayn" ("Discussion of two languages") noted the following five meanings of the word ko'k (blue) (green)<sup>5</sup>:

1) ko'k (blue) – sky, 2) ko'k – tone, 3) ko'k – spring, 4) ko'k – callus, 5) ko'k – grass.

**KO'K** – blue. In the ancient Turkic language, this adjective, which means such and other meanings, was originally pronounced in the form of ko'o'k, and later in the Uzbek language the sign of length and softness was lost. (Sh.Rahmatullaev, OTEL, 223).

If we consider the ko'k yo'tal (whooping cough) lexeme within the meanings of the word ko'k (blue), the aspect of the disease related to the meaning of the tone is also revealed. Symptoms of the disease include a persistent, short cough, shortness of breath, and a shortening of the vocal cords and screaming sound as a result. Hence, depending on the change in the patient's voice or tone, it may also be referred to as whooping cough, i.e. a cough associated with a change in tone. Here it is expedient to base both etymological meanings of the word ko'k. The first is the meaning of blue, the color of the sky, the second is the meaning of tone.

*Cough is a reflex phenomenon, a sign of exposure to the mucous membranes of the bronchi, larynx* (A. Usmankhodjaev, Big Medical Educational Dictionary (BMUS), 210).

Cough can be a symptom of many cough-related illnesses, but whooping cough refers to a specific type of cough. Ko'kyo'tal (whooping cough) lexeme has existed in Uzbek folk medicine since ancient times as the name of the disease. The blue mark on the ko'kyo'tal (whooping cough) lexeme distinguishes this disease from other types of cough. In this case, the nominative function of the Uzbek language is obvious. We can see this in the example of medical terms in the following places. The word ko'k (blue) as a national-cultural symbol in the term kokyotal has realized a specific type of disease in the Uzbek language. In particular, in Russian whooping cough is called - **koklyush**, which is explained in dictionaries as follows:

*Whooping cough – koklyush*, - a, m. Infectious, advantage. childhood illness, expressed in attacks of spasmodic cough II adj. pertussis, th, th (S.I. Ozhegov, Dictionary of the Russian language (SRYa), 247).

In this comment, whooping cough is not associated with blue in terms of the nature of the Russian language. Here, the example of the term ko'k yo'tal (whooping cough) shows how clear and perfect the Uzbek language is in the formation of the term. The Russian name

whooping cough may also be derived from the Uzbek base.

It should be noted that the Uzbek people, in the treatment of whooping cough, based on their own national and cultural traditions, used products made from the feathers and meat of crows, and in many cases prevented the disease in this way.

**Jaundice** – bilirubin produced in the liver is a yellowing of the skin, eyeballs and mucous membranes due to the accumulation of bile pigment in the tissues. Jaundice occurs as a result of an increase in the amount of bilirubin in the blood. According to the causes and mechanism of formation, jaundice is divided into mechanical and hemolytic types, which occur in the liver. Hepatic (parenchymal) jaundice occurs as a result of infectious or toxic poisoning of liver cells, causing various changes in the liver, transferring bilirubin to the intestine: the stool turns pale and the urine darkens. Jaundice is most often caused by Botkin's disease (viral hepatitis), as well as by alcohol poisoning of liver cells. Mechanical jaundice is caused by the inability of bile (bile) to pass through the bile ducts, for example, the inability of bile to pass into the intestine as a result of stones in the gallbladder, and thus the bilirubin in bile stagnant in the bile ducts to pass directly into the blood. In hemolytic jaundice, the breakdown of erythrocytes is much faster than normal and the amount of bilirubin in the blood is high.

Usually, first the whites of the eyes, then the mucous membranes of the soft palate, sublingual and skin turn yellow. The severity of jaundice depends on the amount of bilirubin in the blood. In jaundice, the skin is often itchy because bile acids irritate peripheral nerve fibers in the skin.

In 2-3-day-old infants, jaundice - physiological jaundice - is often observed as a result of a temporary deficiency in liver function.

*Sariq (Yellow) is a adjective in the Sariq kasal (jaundice) lexeme, meaning color, character.* In the vernacular, the people abbreviate and are also called sariqlatma (jaundice) or sariq (jaundice). The word sariqlatma (jaundice) is a bit more accurate in its use, because the verb sariqlatma (jaundice) is used in the sense of not to miss the disease too much. If the patient's body turns yellow and the disease worsens, it means that it is dangerous.

Yellow is the intermediate color in the transition of something from white to red, i.e. the process of reddening of white. Therefore, in the quality of yellow itself, the sign is graded as light yellow, yellow, yellow, reddish yellow, yellowish and orange, very yellow, sap-yellow. Now, if we analyze the specific symptoms of jaundice, in the patient, first the whites of the eyes, then the palate, the underside of the tongue and the skin of the body turn yellow, that is, turn yellow. *The verb sarg'aymoq is derived from the following command form of the character to yellow: sarig' + ay.*

<sup>5</sup> Alisher Navoi. Muhokamatul lug'atayn. MAT.16-tom. Tashkent: "Fan" - 2000, p.



**YELLOW** – *straw colored*. This quality, which has the same meaning in the ancient Turkic language, is pronounced in the form of sarig' (yellow). In Uzbek, the consonant g' is replaced by the consonant q. The -q (-iq) part at the end of this word is an adjective, but it is difficult to explain the meaning of the sari- (sar-) part. This part is a verb meaning "turn yellow." The fact that in most Turkic languages this quality is in the form of **sary** confirms the above idea (O'TEL, 276).

*The main symptom that distinguishes jaundice from other diseases is an increase in yellow color in the body.* This led to the name of the disease associated with this color.

*Jaundice – желтуха, -и, ж. Болезнь печени, сопровождающаяся пожелтением кожи. II прил. Желтушный, -ая, -ое (СРЯ, 164).*

*Желтуха* – Icterus – окрашивание кожи и слизистых оболочек, конъюнктивы глазных яблок в желтый цвет вследствие повышения содержания билирубина в крови (БМУС, 175-176).

Apparently, in Russian, too, jaundice is interpreted in terms of color. This indicates that the exact same term originated between two different language families, and that the cultural-historical etymology of the disease was close to each other.

**Qizilcha (Measles disease)** – acute infectious disease, characterized by fever, mild catarrhal cases (colds, cough), enlargement and pain of the lymph nodes in the neck, and skin rashes. Measles is caused by a virus. When a patient coughs, sneezes, or speaks, the virus in the sputum and saliva enters the air, and then enters the body of a healthy person through the respiratory tract (airborne infection). Measles can infect people of all ages, but most often it affects children between the ages of 2-10. After the disease, the body remains stable immunity.

Patients with measles become infected 2 days before the rash and until the rash disappears. The measles virus can remain in the body for 16-21 days without causing symptoms (incubation period). The period before the onset of the disease (prodromal period) is characterized by a slight flu and cough, most of which go unnoticed.

Simultaneously with these symptoms or after 1-2 days, light pink spots appear on the face and all over the body. The rash returns after 2-3 days without any complications (Encyclopedia of Health (SE), 510-p).

*The term qizilcha (measles) is derived from the addition of the qizil - original adjective -cha- shrinking, petting noun builder. Qizilcha (Measles) is a disease characterized by the appearance of small red (light pink) spots on the body.* Apparently, the name of the disease is associated with this red color.

*The qizil (red) lexeme is the original adjective that represents the sign, and at the same time, represents the name of the disease.* It is self-evident that the adjective word here took the noun-making suffix and jumped,

and, as noted above, revealed the nominative function of language. Now the meaning of the sign in the word qizilcha (measles) is added to the meaning of naming an event, expressing reality. After all, it embodies the name of the disease associated with the color red. In terms of the change in word meanings, the word red here has moved from the category of adjectives to the category of nouns, i.e., from one category to another. There was a substantiation.

**RED** – *blood-colored, crimson*. This adjective, which has the same meaning in the ancient Turkic language, is derived from the verb kyz, which originally means red, with the suffix - (y) l. Later, the hardness mark of the sonants disappeared (O'TEL, 539).

Measles – **краснуха, -и, ж.** Заразная детская болезнь, сопровождающаяся пятнистой сыпью (СРЯ, 266).

*Краснуха* – Rubella – острое инфекционное заболевание детского возраста, характеризующееся появлением сыпи, увеличением желез затылка или шеи. Возбудитель – дерматропный вирус (БМУС, 230).

In Uzbek, measles is interpreted in connection with red, but in the above comments in Russian, the disease is not associated with red. This indicates the morphology of the formation of a specific term in the Uzbek language.

**Qorason (gangrena) disease** – a type of tissue death (necrosis) in a living organism. It is found in all tissues and organs (skin, subcutaneous fat layer, muscles, intestines, gallbladder, lungs), most often in the limbs and abdominal organs. In gangrena disease, due to the evaporation of tissue fluid, its moisture decreases rapidly, the dead tissue turns dark brown (mummification process), dries, hardens and wrinkles.

If there is a lot of tissue fluid and a putrefactive or purulent infection enters it, the decomposition process will intensify. In this case, the tissue softens and begins to rot, it is blue, sometimes dark in color, and it smells bad. As a result of poisoning of the organism by substances released from the decomposed tissue, the general condition of the patient worsens, the body temperature rises, signs of intoxication are observed (SE), 85-p).

*The black lexeme is a compound word consisting of two separate words - black and thigh words.* The word qora (black) in the qorason (gangrena) lexeme is an original adjective, signifying something. *The word "son" is used as a homonym of the Uzbek language in two main senses<sup>6</sup>:* 1) number is a mathematical concept that serves to calculate how many, the number, the number of things. For example, a fractional number, like an integer. 2) the thigh is the part of the human and

<sup>6</sup> Annotated dictionary of the Uzbek language. T.: State Scientific Publishing House "National Encyclopedia of Uzbekistan", 2006, Volume 3, pp. 551-552.



animal leg between the knee and the pelvis. For example, the thigh bone.

*If we analyze the word qorason (gangrena) in terms of its meanings, we understand the thigh that has become black, blackened.* If we take into account the symptoms of the disease, the tissues become soft, bluish, sometimes dark in color, we can see that it is associated with black. Here a thigh of noun lexemes were added to the black quality lexeme, and a substantiation occurred. It embodied the name of a disease peculiar to the noun category. In Uzbek, the term qorason (gangrena) is interpreted in relation to color.

**BLACK** – charcoal, the darkest color. In the ancient Turkic language, this quality, which had the same meaning and several other meanings, was originally pronounced in the form of qara (black). In the Uzbek language, the vowel a in the first syllable is hardened and replaced by the vowel o: qara → qora. (O'TEL, 566).

In Russian: *Qorason (gangrena) – гангрена, -ы, ж. Омертвление тканей организма, сопровождающееся их гниением. II прил. гангренозный, -ая, -ое (СРЯ, 106).*

*Гангрена – Gangraena – одна из форм омертвления (некроза) тканей в живом организме. Виды гангрены: 1) сухая; 2) влажная – гнилостный распад (БМУС, 101).*

*The Russian interpretation of qorason (gangrena) disease does not mention that the disease is associated with black, but in the Uzbek language, the etymology of this medical term is associated with black.*

**Oq qon (leukoz) Leukemia** – (Greek leukos – “white”), oq qon, leukemia, blood cancer - a tumor of the hematopoietic system. It is acute and chronic. Depending on what cells the tumor is made of, the types of oq qon leukemia cell disease vary. Chronic leukemia is a benign tumor. Chronic lymphocytic leukemia, myelogenous leukemia, erythremia, and myeloma are the most common types of oq qon leukemia cell disease.

In both types of leukemia, the number of leukocytes in the blood increases, the leukocyte formula changes, and a progressive anemia (anemia) is observed. In erythema, the face and palms turn bluish-red and the amount of hemoglobin increases with red blood cells (SE), 238-p).

*The color-related name of leukemia is observed only in terms of the Uzbek language.* In other languages, the disease is not associated with color, but is associated with appropriate qualitative changes in the patient's blood composition.

*The term oq qon (leukemia) is a compound word composed of the words white and blood. The word white is the original quality adjective, on a simple level, which means the answer to the question of what and is a sign of something. The word blood is an innumerable noun, which is the answer to the question of what.*

The connection of the term oq qon (leukemia) in the Uzbek language with the name of the disease has a cultural and historical basis. It is characterized by a change in the composition of the blood, that is, changes in the color of the blood of a patient with such a disease are observed. In this case, the metonymy method of semantic transfer in words (Greek means "renaming", meta - "to replace", onoma - "name"), that is, the transfer of meaning on the basis of interdependence.

**OQ (White)** – 1) snow, milky colour. This adjective has the same meaning in the ancient Turkic language and is pronounced long as a:q. At the same time, the elongation sign of a: vowel was lost. In Uzbek, the long a: vowel is replaced by the short a vowel, then the o: a: q → aq → oq.

2) move steadily towards the slope. This verb is also pronounced as aq in the ancient Turkic language. Later, the vowel a was replaced by the vowel o: aq → oq (O'TEL, 262).

**QON (BLOOD)** – “a red liquid that nourishes the organs and cells of a living body, providing metabolism”. This noun, which has the same meaning in the ancient Turkic language, was originally pronounced as qan (blood) (M. Kashgari, Devonu lug'otit turk (DLT), III, 172). In Uzbek, the vowel a is replaced by the vowel o: qan → qon.

In Russian: *Лейкоз (-ы) – Leucosis – системные заболевания опухолевой природы, характеризующиеся прогрессирующим разрастанием кроветворных клеток. Различают лейкоэмический (с высоким содержанием лейкозных клеток) сублейкемический, лейкопенический и алейкемический (безпоявления лейкоэмических клеток в периферической крови) варианты лейкозов<sup>7</sup>.*

Apparently, the above Russian description of leukemia has nothing to do with white or any other color. In the emergence of this medical term in the Uzbek language, we can see a specific nationality, that is, the connection with white.

**Oq sim (murrain) (яшчур)** – acute infectious disease with fever with the formation of aphthae (sores) on the mucous membranes of the mouth, tongue, nose, as well as between the fingers and near the nails. The oq sim (murrain) is infected by the virus, which can be stored in animal hair, hay for up to 1 month, but when heated to 60 degrees and above in the sun, it quickly dies under the influence of disinfectants.

Rodents prone to oq sim (murrain) (mosquitoes, mice, rats) are also carriers of sona infection. Hoofed animals (cows, goats, sheep, pigs) are infected with oq sim (murrain). Murrain disease is transmitted to humans when they feed animals, consume their raw milk and products made from this milk.

<sup>7</sup> Usmanhodzhaev A. Big Medical Educational Dictionary. Tashkent: "Navruz" - 2013, 240-p.



The virus does not cause clinical symptoms of the disease in the human body for 2-12 days (usually 3-4 days) (incubation - latent period). The disease begins acutely, there is a headache, muscle pain, the flesh tingles, the temperature rises to 38-39. Soon small blisters appear on the mucous membranes of the lips, tongue, cheeks, as well as in front of the fingernails and toenails, in the interdigital folds, first filled with clear, then turbid fluid.

When rashes enter the oral cavity, saliva flows a lot, it hurts and irritates when speaking, chewing food, swallowing. The blisters rupture, forming aphthae that heal in 10-14 days. The disease lasts 15–20 days.

*The term oq sim (murrain) is a compound word composed of the words oq (white) and sim (wire). The word white is the original quality adjective, on a positive degree, which means the answer to the question of what and is a sign of something. The word sim (wire) is a cognate noun, which is the answer to the question what.*

**SIM I** – Persian “metal rod”, “thread”, “silver”. 1). A long metal piece in the form of a thread, rod, thread. For example, cooper rod. 2). A conductor that is pulled to an electrical or telephone line. *Electric cable.*

**SIM II** - *kt. ayn.* Siym. What is the need of the treasury for silver jewelry? Oybek, the novel “Navoi” (Annotated Dictionary of the Uzbek Language (OTIL), V, 505).

In Russian: *Ящур* – Aphthae epizooticae – острое инфекционное заболевание вирусной этиологии, передающееся человеку от больных животных, сопровождающееся лихорадкой, образованием афт на слизистой оболочке рта, носа, на языке, а также между пальцами у ногтевого ложа (БМУС, 547).

*There is no reference to white in the Russian description of oq sim (murrain) disease.*

The conclusion is that medical terms related to color in Uzbek may not be associated with color in other languages (for example, whooping cough, gangrena, leukemia, murrain) or may be associated with color only in the name of the disease in another language (for example, measles - krasnukha). However, the characteristics of the disease are not necessarily associated with color. This situation indicates that there are different linguocultural bases in the emergence of terms. If the medical term for color in Uzbek is associated with the same color in another language, then these terms indicate the general etymology and features of the disease.

### Scientific novelty of the Research

- For the first time in the study, medical terms related to color in the Uzbek language are divided into lexical-semantic groups and the component is analyzed;
- The article describes the etymology, morphology and national-cultural aspects

(linguoculturology) of these medical terms on the basis of the method of microanalysis.

- Discovering the ways of word formation in the Uzbek language - morphemics and semantic elements, comparing the origin of color-related disease names with the Russian language.
- The article lists the original meanings of each medical term related to color, its derivative derivative meanings, and the equivalent meanings learned from other languages.

### CONCLUSION

*First, while considering the semantic features of medical terms above, it is necessary to pay attention to their lexical-semantic and linguoculturological features.* Because the terms reflect the national and cultural standard of living of the people.

*Second, the origin, etymology, historical and cultural development of the terms, especially in the field of medicine, play an important role in correctly diagnosing many diseases, identifying and treating their causes.*

*Third, especially in the field of medicine, it is difficult to distinguish its specific features without knowing the name of the disease.* From this point of view, the medical terms related to color in the Uzbek language also have their place in this issue. It is expedient to study them in more depth, to analyze and interpret their national-cultural features from a scientific-theoretical point of view.

### PRACTICAL RECOMMENDATIONS

It should be noted as practical recommendations, to know and differentiate the above-mentioned specific etymology, history and national-cultural features of medical terms related to color in the Uzbek language, at the same time, making an accurate and precise diagnosis (diagnosis), which is recognized as the initial treatment of the disease, increases the effectiveness of treatment.

At the same time, it determines the interrelationships of one linguistic phenomenon with another or, conversely, its individual aspects. This, in turn, eliminates some of the ambiguities and misunderstandings in medical practice.

**A gradual continuation of the study:** In the next stages of our research, it is planned to study the medical terms of the Uzbek language, such as malaria, mumps, anthrax, measles, lexical-semantic and linguoculturological.

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# AN EXPLORATORY CASE STUDY OF ONLINE EDUCATION AND INCORPORATION OF 21<sup>st</sup> CENTURY SKILLS IN SECONDARY CLASSROOMS

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## ABSTRACT

Online learning through remote teaching is an upshot of the COVID-19 pandemic. But it has initiated immediate access to being online, collaborative and communicative, being critical thinkers and creative-settings that can facilitate 21<sup>st</sup> Century skills. Today's students must be able to combine these skills with the effective use of technology to succeed in current and future jobs. The full promise of this learning is dependent, however, on institutions to train teacher's to incorporate 21<sup>st</sup> century skills in its instructional design, delivery and implementation. Teachers must ensure that students who learn in online environments are gaining the skills necessary to compete as citizens and workers in the 21<sup>st</sup> century.

Covid-19 has forced many countries to unchain its academia from its brick-and-mortar existence and embrace an online curriculum. Today, worldwide, students are taking classes, completing homework, and working on projects from their homes. Educators will have to shift their focus to incorporate teaching innovations like online tools, apps, animations and videos to capture the imagination of students while establishing engaging and meaningful communication.

This study focus on areas such as:

1. *Preparedness Level of Teachers: Teachers need to be trained continuously so that they gain competence and confidence.*
2. *Satisfaction among Students and Teachers: This feeling can be leveraged upon to improve dexterity among students and teachers and enable them to achieve the desired learning outcomes.*
3. *Challenges - Online Education: Till the time the challenges are not tackled, the obstacles in the path of ensuring complete online education will not resolve.*
4. *Inequity in Online Education: The governments, at national and international levels needs to work on the front foot to ensure that accessibility and lack of device must not interfere with learning. The experiment of a 'Digital India' will remain a distant dream if a large population of students is gravely disadvantaged by this reality. Granted that the circumstances are peculiar, but it is the moral obligation of the State to ensure that fighting against COVID-19 does not exacerbate the disparities that already exist.*
5. *Strategies and Practices of 4Cs – a blended approach can be achieved in the post covid times, but since we do not know how long this period will take to come, the ground work should get started soon since the new normal will be a blended approach to learning.*
6. *Challenges - 21<sup>st</sup> Century Skills– Teachers of the 20<sup>th</sup> century need to upskill, unlearn and relearn the ways of the 21<sup>st</sup> century by accepting that its time to retrain for the 4Cs to begin with as the holistic development of a learner will largely depend on the skills and competence of the teachers.*

**KEYWORDS:** Online Education ,21<sup>st</sup> Century Skills , Critical thinking ,Creativity , Collaboration, Communication



## 1.0 INTRODUCTION

### 1.1 Background to the Problem

Globally about 1.5 billion children are presently out of school due to COVID- 19 (UNESCO, 2020). The world is facing an unprecedented challenge, and in the education context, teachers, students and parents, around the world are in a confused state. Most schools these days have access to technology and internet and they are increasingly turning to online education. Students are using Zoom, Google Meet for classes and video calls, YouTube for education and leisure, online EdTech to learn. In the first decade of the 21st century, a broad range of attributes, dispositions and skills received considerable attention in educational research and policy. While most countries have developed a strong focus on 21st century skills in their school education systems, this emphasis is still at the policy level rather than in practice and effective approaches for teaching and learning. Limited evidence on valid and reliable assessment exists. This calls for further investment in research on key skills for the 21st century, focusing particularly on teaching, learning and assessment (ACER, 2019). There is widespread consensus, however, that our education systems are failing to adequately prepare all students with the essential 21st century knowledge and skills necessary to succeed in life, career and citizenship (OECD, 2010).

The Central Board of Secondary Education (CBSE) has recently launched '21st Century Skills: A Handbook' consisting of learning skills, life skills and literacy skills. "Simply teaching to test or learning for exams is not going to help a student face everyday life situations. 21st Century Skills are key to the empowerment of children and adolescents to deal with the issues and concerns related to their life.

They experience a number of feelings, many of which are related to their growth and development from childhood to adolescence and beyond..." (CBSE, 2020). The handbook has a list of activities that blend with the content. It emphasizes enhancing the learning skills of students through the learning skills of 4Cs - critical thinking, creativity & innovation, collaboration, and communication.

Like other countries, India also aims to develop its education in all aspects of methods of teaching, learning materials and assessment strategies for all subjects in order to prepare its citizens for living effectively in the changing globe.

*"...key overall thrust of curriculum and pedagogy reform across allstages will be to move the education system towards real understanding and learning how to learn - and away from the culture of*

*rote learning presenttoday. The aim of education will not only be cognitive development, but also building character and creating holistic and well-rounded individuals equipped with the key 21st century skills..."* (National Education Policy, 2020)

Call it a quiet revolution the policymakers are bringing "21st century skills" to the classroom, prompting curriculum makers across the country to rewrite curriculum standards and even to contemplate big changes to existing systems.

*"The National Education Policy lays particular emphasis on the development of the creative potential of each individual. It is based on the*

*principle that education must develop not only cognitive capacities - both the 'foundational capacities' of literacy and numeracy and 'higher-order' cognitive capacities, such as critical thinking and problem solving - but also social, ethical, and emotional capacities and dispositions..."* (National Education Policy, 2020)

### 1.2 Research Objectives

The following are research objectives form the basis of this exploratory case study:

*(1) How do teachers, students in secondary schools and parents of the students perceive online education and the 4Cs of 21st century skills?*

*(2) Are teachers able to address the 4Cs of 21st century skills - critical thinking, creativity, collaboration, communication skills - while teaching with online technologies and how do they ensure that those are incorporated in the secondary class?*

### 1.3 Research Questions

In order to describe the ways that teachers worked through remote teaching using technology and taking online classes and how they integrated 4Cs of the 21<sup>st</sup> century skills into daily e-lessons, the following research questions were explored:

*(1) How do teachers, students in secondary schools and parents of the students perceive online education and the 4Cs of 21st century skills?*

*(2) Are teachers able to address the 4Cs of 21st century skills - critical thinking, creativity, collaboration, communication skills - while teaching with online technologies and how do they ensure that those are incorporated in the secondary class?*

### 1.4 Delimitations and Limitations

This study explored online education in only **one** secondary classroom in a single school. Since the study only described online education in one of the secondary schools in the state of West Bengal, India,



generalization to other schools is limited, as differences in availability of technology, professional development in teaching with technology, age of the students and other demographic differences of the teachers and students vary between schools and can greatly impact how teachers use online education for the benefit of students.

## 2.0 METHODOLOGY

This study utilized a case study research design, a form of qualitative inquiry. The case study allowed for close examination of online education in a single secondary classroom. Examining the context (secondary classroom) was crucial in fully understanding and investigating the research questions. The case study is bounded by the delimitation of the lockdown due to the COVID pandemic and it was so overwhelming a situation that apart from telephonic interviews, conversations and discussions with multiple stakeholders, nothing in the other forms of data sources could come by. Therefore only information given by teachers, students and parents of a single secondary school in the urban city in the academic school year 2020-2021, has utilized.

### 2.1 Research Population and Sampling Method

Purposeful sampling is utilized frequently in qualitative studies to select participants who will provide the most beneficial information to the researcher. Within this case, although there were a number of teachers and their online classes at each secondary school, for the present case study, permission was granted by the Principal / Administrator of the school for an “unstructured telephonic interview” on the condition of no recording and complete and absolute anonymity and for filling up a structured open ended questionnaire. The research questions were allowed to be answered by the teachers and descriptions of the different ways that teachers perceived and used online education in secondary classes were allowed for discussion. The individual teachers utilizing online methodology in the classroom provided an in-depth description of teachers’ perceptions on online education in their classroom. Qualitative data helped explain or build on the findings and determine whether any issues outside of the research questions influenced the delivery of online teaching.

**2.2 Sources of Data Collection** The researcher's strategy for collection of data included collection through the following tools: multiple interviews with

students, teachers, parents; focus group conversations with students pooled together and questionnaires answered by experts – teachers, students, parents and teacher educators and research scholars.

**1. Questionnaire:** Some questionnaire provided useful data and informed about how the participants valued the 21st century skills and about their level of understanding of the online education its benefits and challenges.

**2. Interviews of students, teachers, parents and experts:** Interviews were held with the teachers and students as well as the parents of the students and education experts.

**3. Focus group discussions:** The students collectively shared their learning experiences during their engagement in the online education.

**4. Online data from websites** and information from news on online education across the world: The researcher accessed information on the web pages related to online education and found a similar thought process across the world which helped corroborate the researcher’s theory that emerged out of the qualitative case study.

The interview schedules were semi structured to allow the required flexibility to incorporate new questions according to the demand of the context. The Interpretative validity of data was established by participant feedback method.

### 2.3 Data analysis

For data analysis the telephonic interviews and focus group discussions were transcribed verbatim for qualitative analysis. Interview transcripts were first openly coded to identify relevant codes. Qualitative thematic analyses were employed for the interviews and responses to the open-ended questions. The responses were coded independently with key words and brief descriptions and they were revised for consistent coding and categorizing. The questionnaires were similarly coded.

### 2.4 Protection of Human Subjects

This study provided teachers and students and parents of the students with as much ethical protection as possible. While the research did not present any apparent risks to participants, measures were taken in order to provide teachers and students with complete anonymity and accurate representation. Teachers participating in the research were assured of complete confidentiality and protection of participants’ anonymity.



Participation in the proposed study was voluntary. Teachers were requested for their participation and due permission was taken from the school principal. They were all notified about the goals and intentions of the study. Participants were aware, from the beginning, of the details for participation. To protect anonymity, teachers, students and parents were assigned alphanumeric code numbers.

### 3.0 FINDINGS

Through analysis and coding of interviews, deep comments from the research scholars and the eminent educators, and the context of the working methods, fourteen categories emerged which characterized and described the online classroom from various perspectives and how the teachers practiced and strived for the incorporation of the 21st century skills. Analysis of the categories and on grouping brought into sight six themes as perceptions of online education and incorporation of 21st century skills by teachers in their lessons emerged to answer the research questions. The SIX themes are discussed below:

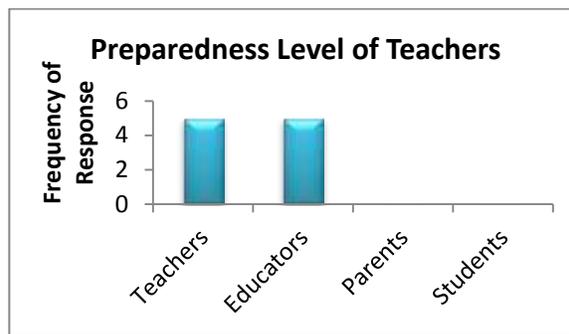


### 3.1 Preparedness Level of Teachers



Covid-19 struck without a warning and left heads of all educational institutions scrambling to respond to its exigencies. It has also created a need to

creatively deal with such unforeseen and once-in-a-century catastrophic events that are being predicted as the 'new normal'. School principals gave a swift response to the pandemic amid the lockdown restrictions. Their alacrity has resulted in a spate of online classes for learners of every level ranging from scholastic subjects, co-scholastic areas such as fine and performing arts to mental wellness and physical fitness. Nevertheless, for teachers switching over to the online mode of teaching is a huge challenge. They have managed to imbibe a number of hard and soft skills to be able to do it successfully to date. However, regular observation of their classes and constructive and timely feedback would definitely help them improve their skills. A good strategy would also be to ask them what they need to learn and to organize focused interventions to help meet their learning gaps.



### 3.1.1 Learning Experiences

This emerged as a category for comments like: technophobia among teachers called fear of technology, some are willing but not exposed to new technology, some teachers cannot handle multiple platforms, they have resistance to change, they fear that students know more and can learn faster, insecurities prevail, lack of accessibility, lack of training, they need to be resourceful, familiarize with technology, learn internet and web search. Hence, the need of the hour is to move along a steeper learning curve.

For schools, training teachers to become adept at teaching online is a herculean task. Ensuring that they have the right hardware and good Internet connectivity is another. Helping teachers transition to virtual classrooms and essentially a brand-new way of doing things has virtually become a reality. Said a teacher, "The importance of classroom learning is undeniable and this pandemic proves that we are not yet ready to handle online classrooms." Teachers spoke about needing more information regarding 21<sup>st</sup> century skills and how to address them in lessons. Because of their uncertainty with 4Cs of 21<sup>st</sup> century



skills, teachers in this study did not plan lessons with these skills in mind.

The suddenness with which teachers have been plunged into online teaching amid the lockdown means they did it with little preparation. Many schools also had no clear markers for how much they were trying to achieve through this changed process. For teachers, their online battles with learning and unruly students could leave impressions that last beyond the immediate concerns of the lockdown.

### 3.1.2 Role of Educators

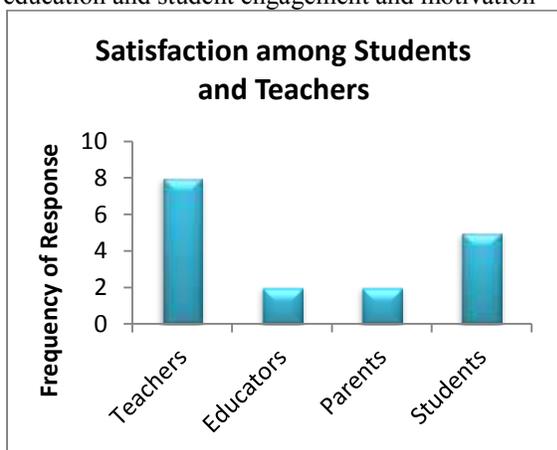
A teacher has to play the role of a facilitator in the classroom, this means that the teacher should not be the king who controls the activities of the learners, but assist the learners in achieving goals, grant them some space for creativity and innovation, critical thinking, collaboration and communication. In other words, the learners must get involved into an active participation that would be represented in argumentative discussions and teamwork activities, so that the process of learning becomes comprehensive.

### 3.2 Satisfaction among Students and Teachers

The categories from which this theme was derived are:



The study identified five elements of student satisfaction: learner relevance, active learning, authentic learning, learner autonomy, and technology competence. Overall there was a positive response from teachers, students, parents as well as the expert educators regarding online education. Thus the theme “Satisfaction among Students and Teachers” was received from the categories: benefits of online education and student engagement and motivation



### 3.2.1 Student engagement and motivation

One teacher commented that “Online classes might last for four hours but we are required to put in almost the same amount of time preparing assignments which are not just useful but also attractive to keep the students engaged”, she said. Students are motivated with active learning, using eBooks and attending Google class. Participative Learning is encouraged as it has interactive quiz eBooks, self reading material, various platforms are available, teachers use multimedia, social media like twitter etc. Video conferencing, synchronous and asynchronous learning is an additional to remain connected.

### 3.2.2 Benefits of Online Education

Online learning platforms help students become independent learners. Online education can also be designed to be accommodating of a variety of learning styles among students. As educators, additional efforts to incorporate online learning into the curriculum will need to be done. They are helping teachers/educators advance their skills in curriculum implementation, policy, education systems and leadership, both independently and with the support of their institutions. It lets them collaborate with their peers, and learn new instructional skills, that are relevant to their career. These help them develop new skills and capabilities in their students, with the help of technology and interdisciplinary approaches. Teachers get trainings, school support, attend international webinars, they prepare different types of lesson plans, lessons which are exciting and interesting to teach and are activity oriented. Of course trial and error, self learning is a part of the game. For students it means enjoyment and happiness with social media, children do not get tired at school through hot days, they are safe at home, they study, they play educational games. Teachers find that assessments are easier. Overall it is a good learning experience.

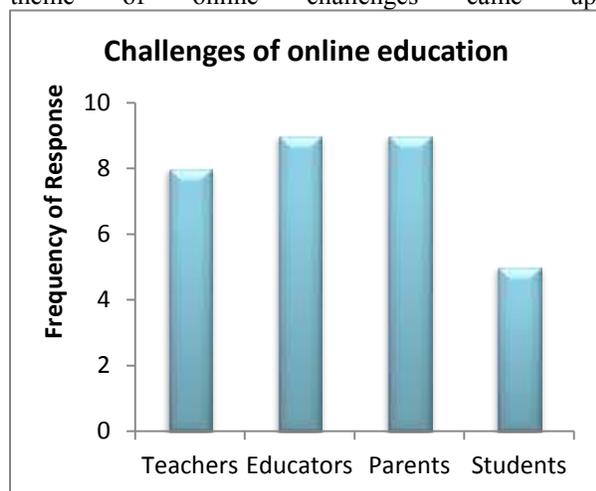
### 3.3 Challenges - Online Education

The categories from which this theme was derived are:





Comparing face-to-face learning with online learning brings forth significant deficiencies in the online mode such as lack of human connect, absence of opportunities of collaborative learning, teacher supervision and the most glaring being lack of opportunities for hands-on learning in complex teaching subjects such as science and mathematics. Besides, amid the rush of hosting online classes the best teaching practices such as addressing learners Multiples Intelligences (MI), VARK Learning Styles and providing a differentiated learning experience or even incorporating 21<sup>st</sup> century skills have been relegated to the backburner. Various categories on this theme of online challenges came up.



### 3.3.1 Online Behaviour, Safety and Privacy

In this time of corona virus, though, with lockdowns closing schools around the world, keeping children safe online has never been more critical. Although online learning has filled a lot of the gaps, what it means is that screen time has increased for many children. Around 60% of 8- to 12-year-olds are exposed to cyber risk, including cyber-bullying. It's important to teach children about cyber risks – cyber-bullying, gaming addiction etc. COVID-19 is making the potential exposure to cyber risk greater, but it's not necessarily a causal effect. Causal effects of cyber risk are lack of knowledge, lack of discipline, uncontrolled and non-supervised digital use. Research shows limiting screen time and the kind of content being watched is related to better mental and physical health, and improved school grades and pro-social behaviour. But the fact is that digital surveillance is missing - that is the need of the hour and the parents and teachers as well as the experts are worried.

### 3.3.2 Physical and Emotional Wellbeing:

Schools and larger education systems have rallied to the charge and swiftly moved through two clear stages of change in the move to distance learning. The first focused on determining the technology platforms to use. The second stage has focused on adapting the delivery of academic curriculums for remote learning environments. These two stages are still in progress and teachers are on a steep learning curve. But as the dust begins to settle on Stage 1 (technology) and Stage 2 (academic curriculum), it has become apparent that a third stage is now needed in schools across the globe – how to teach social emotional learning in digital classrooms. Indeed, now more than ever, the mental health of our students is at risk with youth anxiety about the corona virus rising and our young people feeling isolated, disconnected and confused. Today's students have grown up as digital natives and are adept at learning online. They are always online. Parents worry about the lack of exercises and desire to play out in the park with friends. So there are effects of technology and online learning on student mental, emotional and social health.

### 3.3.3 Lack of Class Management Mechanism

More than anything, online classrooms have brought up the issues of classroom management. If teachers thought they had enough trouble keeping their classrooms in order earlier, that is nothing compared to the woes of remote classrooms. It is very sad to hear long-term educators asking for help with managing students online. How can I maintain discipline? How do I ensure students don't tamper with my presentation? How can I prevent students from disrupting the class? Can students disrupt my class? How? How can I keep the children attentive? What length of class is appropriate for them? They're so young, will online teaching even be effective for them? How can I ensure effectiveness?

### 3.3.4 Technological and Pedagogical Limitations

Teachers who are intimidated by technology now have to take the bull by its horns. For many who are proficient at planning and teaching in the traditional classroom, planning for an online setting requires some re-learning. Finding the right online teaching platform is just the first step. Learning how to use the various features correctly is important. But using a platform and its features to teach effectively and ensure that all students are indeed learning is paramount.

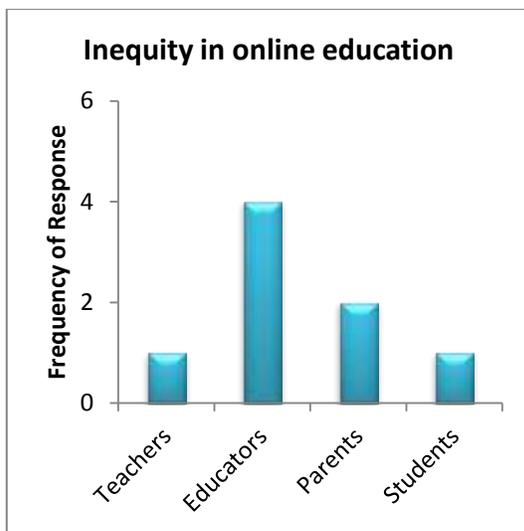


### 3.4 Inequity in Online Education

The categories from which this theme was derived are:

Digital Divide in Accessibility

Hardware and Structural Challenges



#### 3.4.1 Digital divide and Hardware and structural challenges

This digital divide may be attributed to multiple factors – lack of infrastructure in terms of access to internet, absence or dearth of computers in schools, inability of underprivileged students to procure computers, and lack of digital literacy amongst both teachers and students. Mobile connectivity does not imply that every such person would also have access to the internet or that all such mobiles would be smart phones that can support e-learning technology. Even if it is assumed that most people having mobile phones have access, one cannot ignore the issue of lack of

digital literacy. Besides, now that entire families have been confined to their homes due to the lockdown, the only mobile or computer in the house is likely to be used by the parents who are working from home.

Rural India’s poor internet penetration is further exacerbated due to low household incomes, frequent cable cuts, unreliable electricity and insufficient diesel supplies for generators in towers. While there are many unaddressed issues, the truth is that the experiment of a ‘Digital India’ remains a distant dream and a large population of students is gravely disadvantaged by this reality. Granted that the circumstances are peculiar, but it is the moral obligation of the State to ensure that fighting against COVID-19 does not exacerbate the disparities that already exist.

COVID-19 has brought to fore the fact that the right to internet is inextricably linked to the right to education.

### 3.5 Strategies and Practices of 4Cs

The categories from which this theme was derived are:

Strategies of Practitioners

Modes of Teaching and Learning

The 21<sup>st</sup> Century Skills are the skills that are required by an individual for his/her holistic development so that he/she can contribute to the progress and development of his society/ nation and world. Empowering students with these skills is a challenging task (NCERT, 2020).





**3.5.1 Strategies of Practitioners** For practitioner facilitating incorporation of 4Cs of 21<sup>st</sup> century skills, online learning theory suggests that instructional practices must be modified in order to fit with technology. Teaching should not be approached in the same way when technology is utilized (Ally, 2008). To effectively incorporate 21<sup>st</sup> century skills with technology and classroom content, different instructional methods can assist teachers with the integration of all areas, enabling teachers to teach content and 21<sup>st</sup> century skills effectively and efficiently. Utilizing instructional methods such as problem-based learning (PBL). In PBL, groups of students collaborate to problem solve a complex problem-based on classroom content. Through these types of problem solving, students are exposed to all 21<sup>st</sup> century skills, while also learning classroom content.

**3.5.2 Mode of teaching and learning:** All stakeholders were of the opinion that a mix or blend of online and offline (face to face interaction) is more acceptable than either of them completely. Hopefully, when classes resume, after the pandemic settles a bit, in the partial mode, a fair division could be evolved in online-offline practice to ensure that learning outcomes and achievements do not slip.

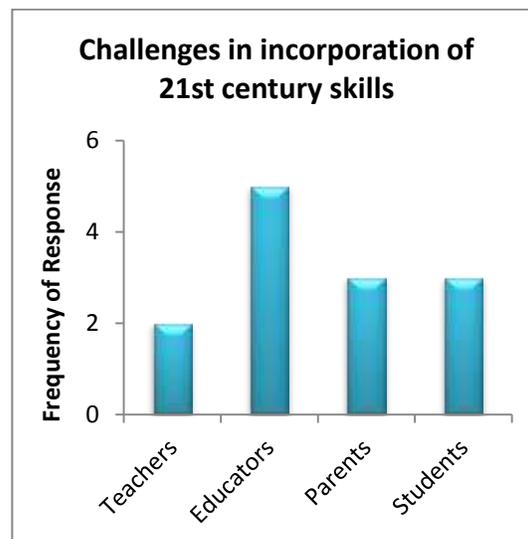
### 3.6 Challenges in Incorporation of 21<sup>st</sup> century skills

The categories from which this theme was derived are:

Lack of Awareness and Resources

Deficiencies in Holistic Development

The next and final theme that emerged from the data was the challenges encountered in incorporation of 21<sup>st</sup> century skills



**3.6.1 Lack of awareness and resources:** Teachers in this study had limited knowledge of 21<sup>st</sup> century skills and, therefore, were unsure about how to incorporate these skills into lessons with technology, with the exception of communication and collaboration, which, in some cases, was facilitated by technology. In fact in the interview one of the teachers mentioned that they embed 21<sup>st</sup> century skills rather randomly in their lessons.

### 3.6.2 Deficiencies in Holistic Development

In holistic education children need to develop the ability to survive in the modern world, not just in academics. They need to meet challenges of the future and contribute to the world in which they live. An expert teacher educator feels that, *“Online learning experiences might lead to the mental and intellectual development of the learners, if the learners are serious enough to study. The other developmental areas like physical, psychological, social, emotional and moral are highly neglected. The outcome of such learning would not lead to the all round development of the learners.”*

## CONCLUSION

Since March 2020, COVID-19 has disrupted normal life including the closure of educational institutions. It has upended academic sessions, led to the scrapping of examinations, delayed admissions for



the new academic sessions and seriously unsettled the plans of those who had geared up to join the workforce or planned to study abroad. COVID-19 has impacted over 240 million students and 9.5 million teachers. This indefinite closure of schools has created an alarming learning vacuum for students. In a bid to ensure continuity in learning, many states and schools began online learning and teachers resorted to emergency remote teaching. Although online education did provide critical service to bridge the gap, it did not turn out to be the silver bullet. A blend of offline-online learning should be the path for the future. This is because the transition from brick and mortar school to technology based learning has its challenges: Unequal access to devices, poor internet connectivity, inadequate space at home to do online schooling for multiple children simultaneously, teachers lacking training to deliver online classes, short supply of customized online content and the impact of continuous exposure to screen time on health. These realities must be acknowledged.

In a country as diverse as India, the delivery of tech-driven education cannot follow a one-size-fits-all approach. It is important to know that education is not only about technology integration but also about learning, learning outcomes, interaction, holistic development, and life skills for 21st century, building up of social and human capital, which only brick and mortar can provide – a real people platform where minds meet. This idea of holistic education has been neatly incorporated in the National Education Policy, 2020 released recently by the Ministry of Education, NewDelhi.

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## PROBLEMS OF STUDYING SPRING TYPES OF THE RUSSIAN LANGUAGE

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### ANNOTATION

*This article examines the issues of Russian modern linguistics as an object of study.*

**KEY WORDS AND PHRASES:** *word formation, grammatical approach, tradition, morphemes, signs.*

## ПРОБЛЕМЫ ИЗУЧЕНИЯ СЛОВООБРАЗОВАТЕЛЬНЫХ ТИПОВ РУССКОГО ЯЗЫКА.

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### Аннотация

*В данной статье рассматриваются вопросы русского современного языкознания, как объект изучения.*

**Ключевые слова и фразы:** *словообразование, грамматический подход, традиция, морфемы, признаки.*

Известно, что словообразование, тесно связано, с одной стороны, с лексикой, с другой - с грамматикой. Оно является одним из основных средств пополнения словарного состава языка новыми словами, а производные слова могут быть предметом различных лексических и лексико-семантических классификаций. На этом основании словообразование нередко рассматривается как часть лексикологии и не включается в грамматику.

Для русской лингвистической традиции характерен грамматический подход к словообразованию. В трудах основоположников учения о словообразовании в русистике Г.О. Винокура[5,22] и В.В. Виноградова словообразование рассматривается как часть грамматики, а словообразовательные средства – как средства грамматические.[2,11]

Возникает вопрос, что служит основанием для такого отношения к словообразованию? Прежде всего тот факт, что словообразовательные средства языка – это главным образом средства морфемные, а сам механизм словообразования, является частью того раздела грамматики, который можно назвать морфемикой, учением о морфемах, включая сюда такие общие проблемы, как виды морфем, взаимоотношение разновидностей морфем (морфов) и их распределение, морфонологические явления, связанные с сочетаемостью морфов и другие формальные аспекты описания морфем, а также типы значений, выражаемых морфемами.

Словообразование вместе с тем представляет собой особый, замкнутый объект исследования, особую систему, которую



целесообразно описывать отдельно от морфологии. С точки зрения морфемики словообразование занимается лишь такими морфемами, которые являются конститутивными признаками слова в целом, а не отдельных его форм. Центральным, специфическим понятием словообразовательной системы, определяющим все остальные понятия, является понятие словообразовательной мотивированности (производности), т.е. синхронической выводимости одного слова (мотивированного) из другого (мотивирующего). В связи с этим основным противопоставлением, присущим самому объекту изучения в словообразовании, является противопоставление мотивированного слова слову мотивирующему (или совокупности мотивирующих слов). В структуре мотивированного слова это противопоставление непосредственно отражается как бинарное противопоставление мотивирующей базы (баз) и форманта. С ними связана и специфика словообразовательного значения, представляющего собой семантическое отношение мотивированного слова к мотивирующему.

Будучи носителем словообразовательного значения, формант, выступает в мотивированном слове как показатель указанного бинарного противопоставления.

В этой связи необходимо остановиться и на термине «производящая (мотивирующая) база». Он не является общепринятым; вместе с тем в словообразовательной литературе до сих пор очень нечетко разграничиваются понятия и термины производящая основа и производящее слово. На самом же деле разные способы словообразования строго различаются в зависимости от того, что основа или слово выступает в качестве исходной базы при словообразовании. При чистой префиксации и постфиксации, а также при смешанном префиксально-постфиксальном способе исходной базой для образования слова является целое слово, например: добрый – пре-добрый, муть- муть-ся, бежать – раз-бежать-ся;

-при суффиксации и смешанных способах словообразования с ее участием – основа, например: писа (ть) – писа-тель, зеркал (о) – под-зеркаль-ник, рук (а) – без-рук-ий, горд (ый) – горд – и (ть) – ся.

При чистом сложении опорный компонент производного представляет собой целое слово, а предшествующие ему компоненты – основы, например:

слеп (ой) + глух (ой) + немой = *слеп-о-глух-о-немой*;

-при суффиксально-сложном способе все компоненты – основы, например: *земл (я) + тряс (ти) = земл-е-тряс-ение*.

Но, безусловно, необходим единый общий термин для обозначения той исходной структуры, которая выступает в мотивированном слове, сочетаясь в нем с формантом. В качестве такого термина В.В. Лопатин предлагает использовать термин «производящая (мотивирующая) база». В частных случаях эта база может быть основой или целым словом. Для сложных, сложносокращенных слов, срощений в соответствии с тем, что они мотивированы более чем одним словом, речь должна идти не об одной производящей (мотивирующей) базе, а о двух и более базах.

Если исходить из распространенного в современной лингвистике разграничения языковой структуры и системы, понимая под структурой специфическое строение однородных лингвистических объектов (в данном случае – слов), а под системой – согласованную, целостную совокупность самих этих объектов и их отношений, то основной единицей структуры языка на словообразовательном уровне следует признать формант, а одной из основных единиц системы – словообразовательный тип. Каждый из типов наряду с другими признаками, характеризуется определенным формантом, присутствующим во всех мотивированных словах этого типа.

Словообразовательный тип – наименьшая единица классификации системы, характеризующаяся совпадением семантических различий с формальными (более мелкие единицы – подтипы – выделяются, как правило, либо только по формальному признаку, либо только по семантическому).

Важнейшей задачей описания словообразовательной системы является выявление в мотивированных словах тех свойств, которые присущи типам в целом (прежде всего это формант и общее словообразовательное значение), и отграничение их от всего того, что присуще отдельным образованиям и группам образований внутри типов (подтипам). Однако для грамматики релевантны в той или иной мере и подтипы. Семантические подтипы внутри типов различаются так называемыми «частными словообразовательными значениями». Последние не столь грамматичны, так как обычно не сопровождаются формальными различиями. Ср., например:

а) различную систему флексий у существительных с суффиксом –л- в зависимости от того, лицо они обозначают или не лицо (при



общем словообразовательном значении «производитель действия»): запевала – точило;

б) особую флексию винительного падежа, связанную с грамматической категорией одушевленности, у существительных с суффиксом –тель-, обозначающих лицо: ср. винительный падеж читателя- выключатель.

Но они непосредственно связаны многими нитями с общим словообразовательным значением типа; последнее же неотделимо от основных реализаций его в конкретных образованиях. Важнейшие из частных словообразовательных значений образуют в каждом типе свою своеобразную систему. Словообразовательные типы, имеющие одинаковое общее словообразовательное значение, могут различаться набором частных значений, реализующих это общее значение; продуктивность «удельный вес» разных частных значений в рамках типа нередко различны; словообразовательные значения, выступающие в одних типах как частные, в других выступают как общие словообразовательные значения (ср., например, общие значения типов существительных с суффиксами –тель и –льщик). Приведем такую параллель: частные словообразовательные значения их можно еще назвать лексико-словообразовательными в такой же мере являются словообразовательными, в какой можно считать словообразовательными средствами дополнительные формальные средства, сопровождающие словообразование (чередование, сдвиг ударения, положения морфов и проч.). Если первые обычно не сопровождаются различиями семантическими, но и те и другие формируют подтипы, характерные для определенных словообразовательных типов.

Вопрос о границах словообразовательной системы как системы словообразовательных типов относится к дискуссионным. Известна точка зрения, достаточно распространенная в языкознании и наиболее отчетливо сформулированная Л.В. Щербой: «Одним из основных отделов грамматики являются правила словообразования, т.е. вопрос о том, как можно делать новые слова. Вопрос же о том, как сделаны готовые слова, - дело словаря»[4]

Эта точка зрения получила дальнейшее развитие в трудах Н.Д. Арутюновой, полагающей, что к словообразовательной системе языка, строго говоря, относятся лишь продуктивные словообразовательные типы. «Синхронное словообразование изучает типы, по которым моделируются новые слова, и элементы словообразования не могут не быть активными». Реальную структуру всех входящих в язык слов

изучает, по мысли Н.Д. Арутюновой, другая дисциплина – «морфология основ» .[1, 41]

Помимо форманта и словообразовательного типа, важную роль в словообразовательной системе играет такая специфическая единица, как словообразовательное гнездо. Под гнездом понимается совокупность однокоренных слов, организованная в соответствии с отношениями словообразовательной мотивированности. В описании, основном на системе словообразовательных типов, необходимо постоянно иметь в виду и систему словообразовательных гнезд.

Выбор части речи в качестве характеристики, определяющей словообразовательную классификацию, вовсе не означает подчинения словообразования морфологии или слияния словообразования с морфологией. Части речи представляют собой данные самим языком грамматические группировки лексики, без учета которых невозможно любое грамматическое описание. Не случайно при сравнении подсистем словообразования разных частей речи выявляются такие релевантные различия, как неодинаковое использование разных способов словообразования, специфические аффиксы, различная типология словообразовательных значений, определяемая категориальными свойствами частей речи, разная степень спаянности словообразовательных значений с морфологическими и др.

Опираясь на признак «частеречной» принадлежности слов, находящихся в отношении мотивации, можно строить грамматическое описание словообразовательной системы двояким образом: либо исходить из части речи (и других, более, частных, формальных и семантических характеристик, мотивированного слова, либо из тех же характеристик слова мотивирующего. Первый подход можно условно назвать ретроспективным (с точки зрения «динамической синхронии» словообразования, второй – перспективным. Первый подход дает возможность выяснить, чем словообразовательно мотивированы и могут мотивироваться слова определенного грамматического класса или подкласса, второй – что образовано (в синхроническом смысле) и может быть образовано от слов того или иного класса или подкласса.

С точки зрения самого предмета словообразования как особой отрасли исследования (как, «сделаны» слова и как они «делаются») одинаково важны и «исходный материал», и «получаемый продукт». Поэтому



есть все основания утверждать, что оба названных подхода к словообразованию – ретроспективный и перспективный – одинаково важны, что они дополняют друг друга. Однако реально в описаниях словообразования предпочитается, ретроспективный подход; это определяется в значительной степени тем, что формант – основная структурная единица словообразования – выделяется, как правило, в составе мотивированного слова, а не мотивирующего. «Перспективный же подход реализуется в последовательном учете грамматической характеристики производящего слова.

Одним из важнейших отношений между языковыми элементами, выступающими в области грамматики, являются отношения синтагматические и парадигматические.

Синтагматические отношения выявляются в словообразовании, как отношения производящей базы (баз) и форманта в структуре производного слова, представляющего собой с этой точки зрения синтагму (Здесь имеется ввиду с точки зрения словообразования).

Характерно, что в ряде работ последнего времени выдвигается мысль о существовании особого «синтаксиса морфем» или гипосинтаксиса, расширяющего рамки синтаксиса в его традиционном понимании (как синтагматики слов), при этом производное слово рассматривается как аналог словосочетания или предложения. Думается, что на первом плане при изучении слова как синтагмы должна быть выдвинута специфически словообразовательная бинарность производного слова в её содержательном и формальном аспектах.

Менее очевидны в словообразовании отношения парадигматические, которые обнаруживаются в рамках такой единицы, как словообразовательное гнездо. Такое понимание словообразовательной парадигматики встречается в частности, у американских лингвистов. Э.Хемп пишет: «Множество родственных слов, содержащих общую основу, и все аффиксы, которые могут к ней присоединяться, образуют парадигму». [3,66]

В более узком и точном смысле под парадигмой следует понимать, по мнению В.В.Лопатина, ряд производных слов, имеющих общее производящее, например: чтение, читатель, читальня, читать, читальный, перечитать, почитать, зачитаться и т.п. [3,56]

При этом само производящее слово в парадигматические отношения с производными им словами не вступает, хотя нередко в значительной степени определяет состав парадигмы. Положение общего производящего

слова в словообразовательной парадигме можно уподобить положению общей основы в парадигме словоизменения.

Думается, что введение понятия словообразовательной парадигмы позволяет провести более глубокую аналогию между нулевыми флексиями и нулевыми словообразовательными суффиксами, чем аналогия, опирающаяся на синонимические ряды. Как те, так и другие нулевые морфемы можно выделять в определенных образованиях (соответственно словоформам и словам) не только на фоне синонимических образований с другими, материально выраженными, аффиксами («горизонтальный ряд»), но и на фоне образований, принадлежащих к определенному ряду значений словоизменительных или словообразовательных («вертикальный ряд») и объединенных тождеством основы (для флексий) или тождеством мотивирующего слова (для словообразовательных суффиксов).

Проведенная параллель между словообразовательной и морфологической системами, конкретизированная применительно к понятию аффиксов, свидетельствует, о грамматичности словообразовательной системы. Специфика словообразования, проявляющаяся в частности, в том, что система словообразовательных значений более сложна, чем система словоизменительных значений, и несколько «прямолинейна». Поэтому и реальные словообразовательные парадигмы и гнезда как воплощение определенных типов парадигм и гнезд, несомненно, более отдалены от самих схем этих типов, чем, например, в изменении парадигмы склонения конкретных слов от своих образцов. По-видимому, в конкретных словообразовательных парадигмах чаще встречаются незаполненные «клетки», чаще приходится иметь дело и с синонимическими образованиями (ср.: ширь-широта-ширина и т.п.).

Это объясняется сильным влиянием лексики, лексического узуса на словообразовательную систему, влиянием, вносящим свои коррективы, подчас весьма существенные, в системные отношения. Однако лексическое влияние не может ослабить системно-грамматической основы словообразовательных отношений.

Таким образом, для русской лингвистической традиции характерен грамматический подход к словообразованию, который рассматривает его в тесной связи со всеми элементами языковой системы.



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## NATIONAL TRADITIONS IN MODERN GERMAN LITERATURE

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### ANNOTATION

*The article deals with the literary tradition in the literature of modern Germany. This article will be interesting to an expert in philology.*

**KEYWORDS:** *literary tradition, imitation, influence, borrowing, literary trend.*

## NATIONALE TRADITIONEN IN DER MODERNEN DEUTSCHEN LITERATUR

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### Anmerkung

*Der Artikel untersucht die Traditionen und modernen Trends der deutschen Literatur.*

**Schlüsselwörter:** *literarische Tradition, Nachahmung, Einfluss, Ausleihe, literarische Bewegung.*

Wissenschaftler sprechen sehr eindringlich über die große Bedeutung von Traditionen als Anreiz für jede Kreativität und argumentieren, dass kulturelle Kreativität in erster Linie durch die Vererbung vergangener Werte gekennzeichnet ist [2], dass „kreatives Festhalten an Traditionen die Suche nach das Leben im Alten, seine Fortsetzung und nicht mechanische Nachahmung der Toten [3, p. 52].

In der Literatur hat der Begriff "Tradition" (lateinisch tradere - zu übermitteln) keine eindeutige Interpretation und wird sowohl in Bezug auf eine aufeinanderfolgende Beziehung, die eine Reihe

aufeinanderfolgender literarischer Phänomene vereint, als auch in Bezug auf die Ergebnisse einer solchen Beziehung [6].

V.E. Khalizev unterscheidet zwei Bedeutungen des Begriffs "Tradition". Im ersten Sinne wird das Konzept als eine Abhängigkeit von früheren Erfahrungen in Form seiner Wiederholung und Variation definiert (hier werden die Begriffe "Traditionalismus" und "Traditionismus" verwendet). Der Traditionalismus beeinflusste die Literatur über viele Jahrhunderte bis zur Mitte des 18. Jahrhunderts. Später verlor er seine Rolle und



wurde als Hindernis für die künstlerische Tätigkeit wahrgenommen, und Urteile über "die Unterdrückung von Traditionen" kamen zum Einsatz. Die zweite Bedeutung des Begriffs "Tradition" hat ihre Relevanz in der veränderten kulturhistorischen Situation erlangt, als der Beginn der rituellen Regulierung auf ein Minimum reduziert wurde (insbesondere im 20. Jahrhundert). Tradition wurde als proaktives und kreatives (aktiv selektives und bereicherndes) Erbe kultureller Erfahrung verstanden, was die Verbesserung der Werte impliziert, die das Erbe der Menschheit ausmachen.

Folglich kommt die literarische Tradition mit literarischen Phänomenen wie Nachahmung, Einflussnahme und Entlehnung in Kontakt. Gleichzeitig unterscheidet sich die Tradition von ihnen darin, dass traditionelles Material, das in einem bestimmten literarischen Umfeld allgemein anerkannt wird, Teil seines künstlerischen Gebrauchs ist, der zu einer gemeinsamen Eigenschaft geworden ist, und dass Nachahmung, Einflussnahme und Ausleihe sich mit Material befassen, das außerhalb des Materials liegt gegebenes literarisches Umfeld und wurde noch nicht von ihm assimiliert. ... Dennoch sind diese logisch unterschiedlichen Konzepte in der Praxis kaum zu unterscheiden, da die meisten literarischen Phänomene nicht durch eine, sondern durch mehrere Verbindungen miteinander verbunden sind [5].

Für eine detailliertere Unterscheidung zwischen den obigen Begriffen betrachten wir ihre Definitionen, die der russische Literaturkritiker I.N. Rozanov. Seiner Meinung nach wird der Begriff "Einfluss" gewöhnlich weit gefasst, häufig einschließlich Ausleihe und Nachahmung. Die literarische Ausleihe ist jedoch im Gegensatz zum literarischen Einfluss immer bewusst. Wenn der Einfluss manchmal vom Autor realisiert werden kann, dann oder nicht vollständig, während das Ausleihen dem Element der Intentionalität innewohnt. Zum Beispiel liest der Autor vorab in die Arbeit einiger anderer Leute ein, um sich von seinem Geist nähren zu lassen oder seinen Stil und seine Sprache zu assimilieren, und verwandelt sich dann leicht in Nachahmung und Stilisierung.

Für viele Autoren wurzelt die Tendenz zum Ausleihen im Bewusstsein, dass die Produkte der Kreativität eines anderen gemeinsames Eigentum sind. Wie Beispiele zeigen (Shakespeare, Goethe, Puschkin), spielen Anleihen eine herausragende Rolle in der Arbeit genialer Schriftsteller. Als I.N. Rozanov, "häufiger weisen Anleihen auf kreative Impotenz (zum Beispiel zahlreiche Änderungen französischer Stücke an russischen Bräuchen), Eile, Faulheit oder Unehrllichkeit des Autors hin" [8].

Ausgeliehene Handlungen herrschten in der verbalen Kunst der frühen Stadien ihrer Entwicklung vor,

bis zur Renaissance und Klassik. Die Arbeit epischer und dramatischer Schriftsteller war die Bearbeitung von Handlungen aus früheren Epochen, der Volkskunst, der Mythologie. Die meisten dramatischen Werke von Shakespeare basieren auf Themen, die der mittelalterlichen europäischen Literatur seit langem bekannt sind. Traditionelle Handlungen der Menschheit (hauptsächlich antike) wurden auch von Klassikern häufig verwendet: Racine, Moliere, Lomonosov, Goethe [9].

In der Literatur der letzten Jahrhunderte, insbesondere in der Arbeit realistischer Schriftsteller, sind neu geschaffene, originelle Handlungen in den Vordergrund gerückt. Aus früherer Literatur entlehnte Grundstücke spielen jedoch weiterhin eine bedeutende Rolle. So wurden die Motive der Legende über den Hexenmeister Faust aus dem deutschen Mittelalter im 19. Jahrhundert der Menschheit gegeben. Goethes "Faust" und im 20. Jahrhundert. - T. Manns Roman "Doktor Faustus". Folklore, antike, biblische und evangelikale Handlungen werden auch häufig in der literarischen Arbeit verwendet. Basierend auf bereits in der Literatur bekannten Handlungen haben Schriftsteller und Dichter tiefe moralische und philosophische Probleme aufgeworfen und werfen diese auf. Manchmal verkörpern sie künstlerisch breite Verallgemeinerungen und vergleichen (sowohl in Ähnlichkeit als auch im Gegensatz) die Phänomene verschiedener historischer Epochen miteinander. Die häufigsten Anleihen von Zeichen, Positionen und Texten. In der Poesie sind Klanganleihen besonders wichtig: Größen, Rhythmen und Reime [6].

Nachahmung unterscheidet sich von Ausleihe dadurch, dass das Element der Ähnlichkeit hier besonders wichtig ist und beim Ausleihen der Schwerpunkt auf seiner eigenen Verarbeitung liegt. Nachahmung entsteht aus dem Wunsch, dem Modell nahe zu kommen, es zu erreichen oder zu übertreffen. In einigen Fällen grenzt die Nachahmung externer Techniken an die Stilisierung. Die literarische Tradition ist oft gleichzeitig mit Einfluss, Nachahmung und Entlehnung verflochten, zum Beispiel die Poesie von M.Yu. Lermontov spiegelt einerseits die Byron-Tradition wider, die durch A.S. Puschkin hingegen ist eine Reihe direkter Imitationen von Byron [5].

Das Material der literarischen Tradition kann viele Elemente der Prosa und praktisch alle Elemente der Poetik sein: Gegenstand, Komposition, Stilistik, Rhythmus. Häufiger werden diese Elemente jedoch von der Tradition nicht getrennt, sondern in gewisser Kombination miteinander übertragen, entsprechend der ständigen Verbindung, die in der Kunst des Wortes in literarischen Trends und Trends zwischen ihnen besteht [5].



Der Bereich der literarischen Tradition kann sowohl die Kreativität eines Volkes als auch die internationale sein: Man kann von der klassischen Tradition in der Weltliteratur oder der Brecht-Tradition in der deutschen Literatur sprechen.

Die Intensität der literarischen Tradition kann ungleichmäßig sein: Eine separate Tradition wird manchmal schwächer, dann stärker und hört schließlich auf. Eine verblasste Tradition kann jedoch unter dem Einfluss historischer Bedingungen wiederbelebt werden. Gleichzeitig stirbt das Material der ausgestorbenen Tradition nie bis zum Ende ab: Auch wenn die allgemeinen Bedingungen, die die Tradition stützen, verschwinden, bleibt es als literarischer Überrest.

In jedem literarischen Prozess gibt es eine Kombination aus zwei Prinzipien: Tradition und persönliche Kreativität. Wo persönliche Kreativität die Tradition vertieft, kann man von literarischer Evolution sprechen. An dem Ort, an dem sich persönliche Kreativität gegen Tradition auflehnt, entsteht eine literarische Revolution [9]. Für den Fall, dass sich die persönliche Kreativität gegen die Tradition auflehnt, schafft sie oft eine neue Tradition: So legte die Romantik als Beginn der Anti-Tradition in Bezug auf die klassische Kunst selbst den Grundstein für eine neue, romantische Tradition. Persönliche Kreativität kann auch neue Traditionen etablieren, ohne mit alten zu brechen. So gelang es G. Heine, die romantische Tradition und später die klassische Tradition in seine Poesie aufzunehmen. Verschiedene Traditionen können koexistieren, manchmal vereinen sie sich zu einem Ganzen, manchmal berühren sich nur einige Teile. Oft wird ein Protest gegen die Tradition nicht dadurch ausgedrückt, dass etwas Neues geschaffen wird, sondern dass das Alte wiederbelebt wird [11].

In dieser Studie wenden wir uns der literarischen Tradition in der Arbeit zeitgenössischer deutscher Autoren zu. Gleichzeitig wird Tradition nicht als Blick auf bewährte literarische Autoritäten angesehen, sondern als Suche nach Unterstützung in einer etablierten, bewährten literarischen Erfahrung, die sich bewährt hat.

Das neueste deutsche Vereinigte Deutschland ist gekennzeichnet durch die Verarbeitung der Tradition vergangener Jahre, die Verbindung mit der Literatur der Vergangenheit, die Verwendung zuvor gesammelter Erfahrungen, versteckte Zitate, eine Art Umbesetzung alter literarischer Elemente, um neue Werke zu schaffen. das heißt, nach den Worten des Forschers der Postmoderne, N. Mankovskaya, „literarische Codes von Vorgängern als Mittel der Kunst zu betreiben

Modellierung “[5, S. 188] Zum Beispiel finden wir in Reinhard Jirgls Farewell to Friends (1995) eine intertextuelle Verbindung zu Odyssey,

Michael Kohlhaas, Tin Drum und anderen Werken der deutschen und Weltliteratur.

In den 1990ern. Vieles von dem, was zuvor abgelehnt worden war, wurde begrüßt. Eines blieb inakzeptabel - der Geist, mit der Tradition zu spielen, die sowohl postmoderne Werke schrieb als auch las (was die Deutschen für sehr gefährlich halten), konstruierte oder vielmehr „dekonstruierte“. In der Folge trat das Thema Postmodernismus unter dem Druck der spezifischen deutschen politischen Situation in den Hintergrund. Und nach der Vereinigung Deutschlands entstand der sogenannte nichtdeutsch-deutsche Streit, der bis heute andauert [4].

Im Rahmen der Kontroverse steigt die literarische Debatte in die Rolle des Lesers, dessen Präferenzen bisher nicht so wichtig waren. Er selbst reinigt den Literaturmarkt von "Müll". Die Vereinigung Deutschlands führte zu einer Veränderung der Kunststruktur. Im Allgemeinen darüber und begann die große Debatte der deutschen Intellektuellen, die sich vorstellten, dass ihre Debatte zu Ordnung in der deutschen Literatur führen könnte. Die gegenwärtige Situation wurde von einem der bekanntesten zeitgenössischen deutschen Schriftsteller, Botho Strauss, in seinem im Februar 1993 im Spiegel veröffentlichten kulturellen und politischen Aufsatz "Delightful Bleating of Rams" stark charakterisiert [7].

Strauss sprach von "Schlafsturheit" und meinte damit die Trägheit des Bewusstseins einiger deutscher Schriftsteller, die nicht bereit waren, neu zu denken. Die Debatte, die nach der Veröffentlichung ausbrach, war ein Beweis für Intoleranz. Im Laufe des Jahres nahmen mehr als fünfzig Autoren an der Diskussion teil. Es ist unmöglich sich vorzustellen, dass so etwas in der ehemaligen BRD passieren würde. Aber wie hätte er die Leidenschaften der Autoren des Runden Tisches so entfachen können? Der gleiche Bo-to-Strauss, der 1991 mit seinem Theaterstück The Final Chorus einen wesentlichen Beitrag zur Erreichung der deutschen Einheit geleistet hat, schreibt nun, dass ein Zeitgenosse, der heute nicht mit einer politischen Krankheit infiziert ist, zwischen Fluchtversuchen und Fluchtversuchen unterscheidet eine Tendenz, sich hinter der Fassade gerissener Umlagerungen und Veränderungen zurückzuziehen. Zurück [10].

In der literarischen Gesellschaft der Ex-DDR brach eine eigene Diskussion aus. Auf den Publikationsseiten strömte ein Publikationsstrom zur Geschichte der DDR-Literatur. Die Namen der Schriftsteller, die zuvor von der Literaturgemeinschaft ignoriert wurden, sind bekannt geworden. Die sogenannte "oppositionell-kritische" (F. Kvilitsh) Literatur tauchte auf. Der heterogene Charakter der gesamten DDR-Literatur wurde



offenbart. In Bezug auf ein solches "unerwartetes" Auftreten eines oppositionellen kritischen Trends in der DDR-Literatur fand auf den Seiten deutscher Zeitschriften eine weitere lebhaftere Diskussion statt, diesmal jedoch zwischen ost- und westdeutschen Literaturwissenschaftlern. Es liegt auf der Hand, dass sein Hauptziel darin bestand, die Namen von Schriftstellern wiederherzustellen, die verfolgt und gezwungen wurden, aus dem Land auszuwandern, die Lücken in der Geschichte der DDR zu schließen und die oppositionelle kritische Bewegung zu bewerten, die sich für zwei versteckt hatte Jahrzehnte [4].

Sowohl westdeutsche als auch ostdeutsche Kritiker interessierten sich natürlich nicht nur für literarische, sondern auch für moralische Probleme. In diesem Zusammenhang nahm die Frage nach dem moralischen und politischen Verhalten der Schriftsteller, ihrer bürgerlichen und moralischen Position den zentralen Platz in der Diskussion der Schriftsteller beider Teile Deutschlands ein. Es wurden auch Fragen nach der Rolle und dem Platz der DDR-Literatur in der aktuellen Situation und nach den Aussichten für eine weitere Entwicklung gestellt. Einige westdeutsche Kritiker sprachen über die ideologische Ausrichtung der ostdeutschen Literatur, und die Medien zeigten eine Tendenz zur Auflösung, zusammen mit der DDR und ihrem spirituellen Erbe, ihrer Literatur und einer besonderen Mentalität. Ostdeutsche Kritiker verteidigten die Literatur der DDR gegen Versuche, ihre Bedeutung herabzusetzen [5].

Literaturdebatten in den 1990er Jahren in Westdeutschland und die Kontroverse um den Status der Ex-DDR-Literatur sollten in vielerlei Hinsicht als Fortsetzung der Debatte der 1970er Jahre verstanden werden. „Eine der Dominanten der ästhetischen Diskussionen am Ende des Jahrhunderts sind die Aussichten für eine künstlerische und ästhetische Entwicklung im 21. Jahrhundert. In diesem Zusammenhang ist eine Analyse nicht nur des aktuellen Zustands der Postmoderne zu erwähnen, sondern auch jener östlichen postmodernen Perspektiven, die sich zunehmend durchsetzen. Zumindest einige Vektoren möglicher Entwicklung - Technobilder, Virtuasist, Transsentimentalismus - haben sich ganz deutlich manifestiert. Die Ostpostmoderne bringt im Gegensatz zur Moderne und Postmoderne einige neue nicht-klassische ästhetische und künstlerische Kanone und nicht bestimmte allgemeine Herangehensweisen an die Ästhetik vor; er versucht, ein grundlegend neues künstlerisches Umfeld (virtuelle Realität) und einen Umgang damit (Interaktivität) zu schaffen“ [10].

Diskussionen über mehrere Jahrzehnte spiegelten tatsächlich die Tatsache wider, dass deutsche Kritiker und Schriftsteller versuchten, sich

an der aktuellen Situation zu orientieren und den Weg der weiteren Bewegung zu skizzieren. Der Prozess selbst ist jedoch in den letzten Jahren nicht stehen geblieben [4].

Die neue Generation von Schriftstellern unterscheidet sich stark von ihren Vorgängern und fühlt sich in der Weite der Postmoderne wohl: Sie zeigen kein besonderes Interesse daran, den Wert und den Ort der literarischen Produktion unter den Bedingungen kapitalistischer Marktbeziehungen theoretisch zu verknüpfen und zu rechtfertigen. Das zentrale Thema der Nachkriegszeit und der siebziger Jahre - das Studium des Phänomens des Nationalsozialismus - wird nicht als gesellschaftspolitische Notwendigkeit angesehen, die Vergangenheit zu verstehen, und schließlich neigen junge Schriftsteller nicht dazu, historisches Material zu überarbeiten ihnen ist es nur Material, das leicht umgeschrieben werden kann. Die Geschichte der BRD- und DDR-Staaten steht in ihren Arbeiten nicht im Vordergrund, sondern nur ein Hintergrund, der die Atmosphäre des Buches schafft, ein Hintergrund, der oft entfremdet und übertrieben erscheint [2].

Das postmoderne Paradigma, das die literarische Kreativität in anderen europäischen Ländern viel früher in Besitz genommen hatte, drang mit erheblicher Verzögerung auch in die deutschsprachige Literatur ein. 1990er Jahre gekennzeichnet als Fortsetzung der dritten Phase der Entwicklung der Postmoderne, die Ende der 1970er Jahre begann. Es sind die letzten zwanzig Jahre, die von der Geburt der Kultur der Postmoderne zeugen, die aus der Verschmelzung der Trends der beiden vorangegangenen Jahrzehnte hervorgegangen ist. Infolgedessen führte das Aufkommen der Postmoderne im deutschsprachigen Literaturraum zu einer Neuorientierung des problemkünstlerischen Vektors der Literatur: Die Autoren widmeten der Reflexion über den Prozess des Schreibens eines Werkes mehr Aufmerksamkeit und boten dem Leser eine Vielzahl von Anfang und Ende usw. Das Konglomerat der literarischen Mittel wurde transformiert, wodurch literarische Formen bereichert und neue Konfigurationen angenommen wurden.

In Bezug auf die Besonderheiten des modernen Literaturprozesses im wiedervereinigten Deutschland sind sich die meisten Teilnehmer und Forscher einig, dass das Hauptmerkmal der gegenwärtigen Manifestation des literarischen Lebens die mangelnde Bereitschaft der Schriftsteller ist, sich als künstlerische Grundlage, Assoziationen, Schulen oder Trends zu klassifizieren, Richtungen für den Aufbau eines literarisch-ästhetischen Raums. Auf der literarischen Bühne des modernen Deutschlands begannen in der Regel "Solisten" aufzutreten. Die Stimmen dieser sogenannten "Solisten" und ihrer wenigen Anhänger und



Anhänger verlieren sich im Meer der Literatur, die mit dem Begriff "Mainstream" bezeichnet wird und ein Marker für die Freiheit der kreativen Meinungsäußerung im postmodernen Alltag geworden ist [2].

Im modernen Deutschland wie auch in anderen deutschsprachigen europäischen Ländern ist die Vereinheitlichung oder Abgrenzung von Schriftstellern auf der Grundlage künstlerischer und ästhetischer Prinzipien kein bestimmendes Zeichen für die Strukturierung des literarischen und künstlerischen Raums. Kreative Organisationen, die Schriftsteller auf der Grundlage konzeptioneller (kulturästhetischer, kulturideologischer) Plattformen und Programme zusammenbringen, arbeiten normalerweise in einem engen Kreis von Teilnehmern und haben keine „herausragenden“ Führungskräfte, die in der Lage wären, relevante Ideen einer breiten Öffentlichkeit zu vermitteln Publikum. Beispiele sind die Rheinbrigade, KOOK, Forum 13, Libus, Kreisverkehr, ultimative Akademie und andere.

Erschöpft von endlosen Diskussionen hat die Literatur des vereinten Deutschlands dennoch ihren Platz im modernen Kulturraum gefunden. Es wurde nicht schlimmer, es passte sich nur den heutigen Bedingungen an und veränderte den Maßstab, den Grad der semantischen Sättigung, die künstlerischen Mittel und Methoden zur Darstellung der Realität. Trotz aller Veränderungen, des Aufeinandertreffens von Traditionen und Innovationen hat die deutsche Literatur ihre Originalität nicht verloren. Noch heute ist sie ständig bereit für Diskussionen und Einigung [2].

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# DESIGNING A CONSTRUCTIVE GUIDANCE SYSTEM WITH REAL TIME OBJECT DETECTION FOR VISUALLY IMPAIRED

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## ABSTRACT

*This paper proposes an effective device for visually impaired person in order to have betterment in their routine life. The spread of visually impairment is very sensitive issue worldwide. Here we develop a Smart system for visually impaired, that make use of ultrasonic sensor and camera. The most point of this work is to plan a voice-based cautioning framework for the outwardly impeded individuals. Visually impaired individual's finds navigation difficult as they struggle every day in performing actions for bypassing obstacles and hurdles in their regular life. In order to help visually impaired people navigate safely and quickly this system is proposed. Ultrasonic sensor is set on the exhibition which is utilized for impediment location with separate sign. The camera is set to detect the object before the outwardly impeded individuals and alarm them utilizing APR voice module. This system prevents the visually impaired people accidents and identifies the object in front of them. The scope of the work is extracting the object's image and processing them in the knowledge base and interpret the captured one. Assistive Innovation for individuals with outwardly disabilities is anticipated to develop at a quick pace and affect the lives of people having visual impedance and the elderly ways previously is not possible.*

**KEY WORDS:** SURF-Speedup Robust Feature, VPN- Visual Handling Unit, NCS-Neural Compute Adhere, APR-Apache Portable Runtime.

## I.INTRODUCTION

Visual impairment and visual impairment may be a worldwide issue with imperative socio-economic results that have demonstrated impacts on the quality of life of people, and more often than not force extraordinary family-related and socio-economic losses [1]. Blind people make maximum use of sound not only to know the obstacle presence, but also how dangerous it is, in order to avoid it effectively, the devices use acoustical sounds in arrange to speak to the visual data recognized by the sensors and manufactured vision frameworks[2]. The objective of this paper is to create a low-cost shrewdly framework for directing people who are dazzle or somewhat

located by giving data around the natural situation of static and dynamic objects around them [3]. The most capacities of this framework are way sign and environment acknowledgment. However, many obstacle detection and avoidance systems have been introduced during the last decade to assist visually impaired to navigate in known or unknown, indoor and outdoor environments [4-7]. This route can basically be categorized as vision improvement, vision substitution and vision substitution. Vision replacement systems provide the visual cortex of the human brain with the information either directly or via the optic nerve. Vision substitution and Vision upgrade frameworks have nearly same working



standards with regard to environment location handle; in any case, each gives the natural data differently. [8-12] Vision improvement puts the data in a visual way, though vision substitution regularly employments tangible or sound-related recognition or both. We propose a Smart system to help such visually impaired people in their basic activities of life only since one needs to utilize their eyes is not cruel that one needs vision [13-15]. Eyesight is one of the fundamental human faculties, and it plays a critical part in human recognition around the encompassing environment. For visually impaired people to be able to provide, experience their vision, imagination mobility is necessary The Worldwide Classification of Maladies 11 (2018) classifies vision impedence into two bunches, remove and close showing vision impairment. Globally; the leading causes of vision impairment are uncorrected refractive errors, cataract, age-related macular degeneration, glaucoma, diabetic retinopathy, and corneal opacity, trachoma, and eye injuries. It limits outwardly disabled capacity to explore, perform regular errands, and influence their quality of life and capacity to connect with the encompassing world upon unaided. With the headway in advances, assorted arrangements have been presented such, as the Eye- ring extend, the content acknowledgment framework, the hand signal, and confront acknowledgment framework, etc. Be that as it may, these arrangements have impediments such as heavyweight, costly, less vigour, more acknowledgment, etc. consequently, progressed methods must advance to assist them[19,20]. So, we propose a framework built on the breakthrough of picture preparing and machine learning.

## II. RELATED WORK

In later a long time, a few infrared-enabled profundity sensor-based and visual sensor-based frameworks have been created to assist the Visually Impaired in identifying and maintaining a strategic distance from impediments. Visual sensor based frameworks utilize stereo or monocular cameras to procure image data of the encompassing environment and analyse it to estimate obstacle positions. These arrangements are by and large cost effective, available, require small or no foundation, are typically wearable, and can as a rule be introduced or embedded into existing portable computing gadgets. Be that as it may, their performance break down quickly in uncontrolled real-world environments due to imaging variables such as movement blur, image determination, video commotion, etc., as well as changes in conditions such as brightening, introduction and scale. Other limitations incorporate helplessness to impediment issues and high

computational fetched. Too, stereo cameras are relatively costly and require exact calibration. [11]

## A. WORKING PRINCIPLE

In our proposed system, we've Arduino UNO microcontroller which acts as brain of our system, hence entire systems program is stored in it. We've two units, 1. Walk stick unit 2. Head Unit. The Walk stick consists camera to capture the image of the thing and send the knowledge to controller via serial communication.

Ultrasonic sensor determines the space between ground and stick just in case of staircase they approach, these data transmitted via zigbee to the top Unit. Where the APR module is employed to store voice messages it play through speaker depending upon the info received via zigbee.

## BLOCK DIAGRAM

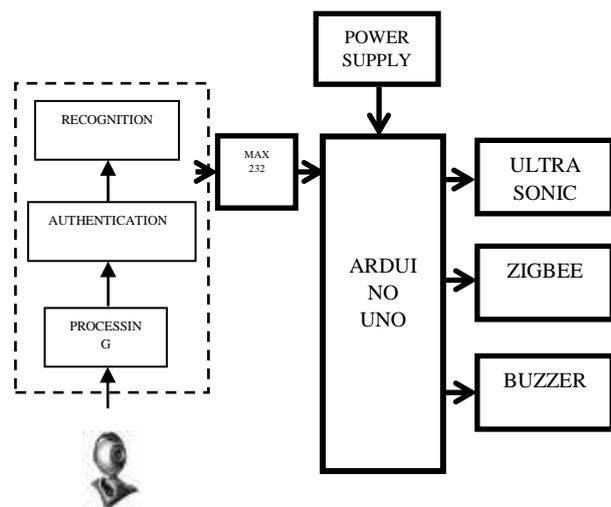


FIG: 1 ARCHITECTURE DIAGRAM

## HEAD UNIT

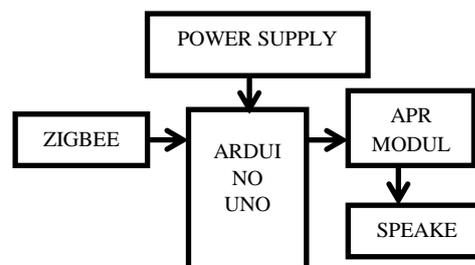


FIG: 2 HEAD UNIT DIAGRAM



Overall working principle of the walking stick portrays the overall view of the blind stick. The adhere consists of eight ultrasonic sensors in the front side in order to cover the encompassed region (front, cleared out and right side) of an outwardly impeded individual and the sensors recognized separate of the impediment is send to the client earphone by means of a portable app.

## **B.HARDWARE**

Arduino is open-source equipment. The equipment reference plans are conveyed beneath an Imaginative Commons Attribution Share-Alike 2.5 permit and are accessible on the Arduino site. Format and generation records for a few forms of the equipment are too accessible [2].

In spite of the fact that the equipment and computer program plans are openly accessible beneath copy left licenses, the engineers have asked the title Arduino to be elite to the official item and not be utilized for inferred works without authorization. The official arrangement archive on utilize of the Arduino title emphasizes that the venture is open to consolidating work by others into the official item. A few Arduino-compatible items commercially discharged have maintained a strategic distance from the extend title by utilizing different names finishing in-duino. An early Arduino board with an RS-232 serial interface (upper cleared out) and an Atmel ATmega8 microcontroller chip (dim, lower right); the 14 computerized I/O pins are at the beat, the 6 analog input pins at the lower right, and the control connector at the lower cleared out.

Most Arduino sheets include of an Atmel 8-bit AVR microcontroller (ATmega8, ATmega168, ATmega328, ATmega1280, ATmega2560) with moving entireties of streak memory, pins, and highlights. The 32-bit Arduino Due, based on the Atmel SAM3X8E was presented in 2012. The sheets utilize single or double-row pins or female headers that encourage associations for programming and joining into other circuits. These may interface with add-on modules named shields. Different and conceivably stacked shields may be exclusively addressable by means of an I<sup>2</sup>C serial transport. Most sheets incorporate a 5 V direct controller and a 16 MHz precious stone oscillator or ceramic resonator. A few plans, such as the LilyPad, run at 8 MHz and apportion with the on-board voltage controller due to particular form-factor confinements. [2]

Arduino microcontrollers are pre-programmed with a boot loader that disentangles uploading of programs to the on-chip streak memory. The default boot loader of the Arduino UNO is the optiboot boot loader. Sheets are stacked with program code by means of a serial association to another computer. A

few serial Arduino sheets contain a level shifter circuit to change over between RS-232 rationale levels and transistor–transistor rationale (TTL) level signals. Current Arduino sheets are modified by means of Widespread Serial Transport (USB) actualized utilizing USB-to-serial connector chips such as the FTDI FT232. A few sheets, such as later-model Uno sheets, substitute the FTDI chip with a partitioned AVR chip containing USB-to-serial firmware, which is reprogrammable by means of its claim ICSP header. Other variations, such as the Arduino Scaled down and the informal Boarduino, utilize a separable USB-to-serial connector board or cable, Bluetooth or other strategies. When they are being utilized with standard microcontroller contraptions, rather than the Arduino IDE, standard AVR in-system programming (ISP) programming has been utilized. An official Arduino Uno R2 with portrayals of the I/O areas

The Arduino board uncovered most of the microcontroller's I/O pins for utilize by other circuits. The Diecimila, [a] Duemilanove, [b] and current Uno[c] give 14 computerized I/O pins, six of which can deliver pulse-width balanced signals, and six analog inputs, which can too be utilized as six computerized I/O pins. These pins are on the best of the board, through female 0.1-inch (2.54 mm) headers. A few plug-in application shields are moreover commercially accessible. The Arduino Nano and Arduino-compatible Revealed Bones Board and Boarduino sheets may grant male header pins on the underside of the board that can plug into patch less breadboards.

Numerous Arduino-compatible and Arduino-derived sheets exist. A few are practically proportionate to an Arduino and can be utilized traded. Numerous upgrades the fundamental Arduino by including yield drivers, regularly for utilize in school-level instruction, to streamline making buggies and little robots. Others are electrically proportionate but alter the frame figure, in some cases holding compatibility with shields, now and then not. A few variations utilize distinctive processors, of shifting compatibility.

## **III.PROPOSED & ALGORITHM**

The most advantage of the framework is that it makes a difference the daze individuals in both indoor and open air, care-free navigation. The devices placed within the stick makes it comfortable and straightforward to handle. The smart stick helps in detecting obstacles placed at a distance ahead of the user. The framework is reasonable for both indoor and open air environment. The information regarding obstacles is given through voice alerts, eliminates the difficulty



RASPBERRY PI Ultra sonic SENSOR Voice synthesizer Battery Micro phone Buzzer Rf receive Camera Water sensor. (9v dc) RF transmitter Button Worldwide Diary of Immaculate and connected math Uncommon Issue 4534 of understanding vibration designs which was utilized in prior systems. The system may be a moderate budget mobile navigational aid for the visually impaired [2].

- In our proposed system, the blind people has camera enabled walking stick to examine which object it is.
- Here, we have distance sensor detects depth or height the staircase step and tells to people.

## E. METHODOLOGY

**INPUT IMAGE:** Picture preparing is a strategy to play out certain procedure on a picture, to get an improved picture or to remove some helpful data from it. It is a kind of sign handling wherein input is a picture and yield might be picture or qualities/highlights related with that picture. These days, picture planning is among rapidly creating progressions. In its local shape, a design record organize picture isn't put away as a MATLAB network, or indeed fundamentally as a network. Most illustrations records start with a header containing format-specific data labels, and proceed with bitmap information that can be examined as a ceaseless stream. For this reason, you cannot utilize the standard MATLAB I/O commands stack and spare to perused and compose a design record arrange picture. Call uncommon MATLAB capacities to studied and type in picture information from illustrations record designs: To peruse a design record organize picture utilize imread.

## IMAGE PREPROCESSING

Preprocessing procedures are required on colour, grey-level or parallel record pictures containing content and/or design. In character acknowledgment frameworks most of the applications utilize dark or parallel pictures since handling colour pictures is computationally tall. Such pictures may moreover contain non-uniform foundation and/or watermarks making it troublesome to extricate the record content from the picture without performing a few kind of preprocessing, subsequently; the specified result from preprocessing may be a twofold picture containing content as it were. Hence, to realize this, a few steps are required, to begin with, a few picture upgrade strategies to evacuate noise or adjust the differentiate within the picture, moment, thresholding to evacuate the foundation containing any scenes, watermarks and/or

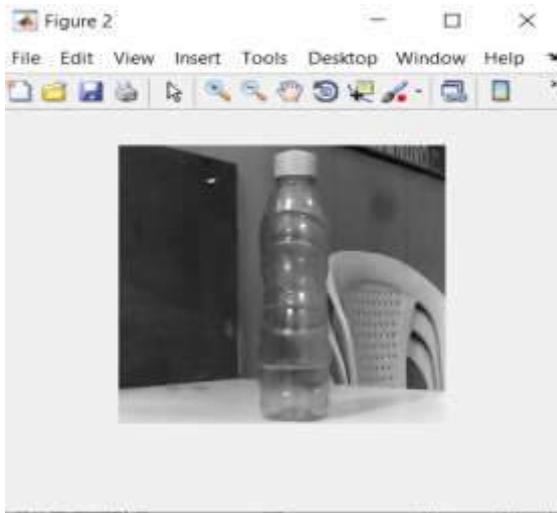
clamor, third, page division to isolated design from content, fourth, character division to partitioned characters from each other and, at long last, morphological preparing to improve the characters in cases where thresholding and/or other preprocessing strategies disintegrated parts of the characters or included pixels to them. The over methods show few of those which may be utilized in character acknowledgment frameworks and in a few applications; few or a few of these strategies or others may be utilized at diverse stages of the OCR framework. The rest of the chapter will display a few of the methods utilized amid the preprocessing organize of a character acknowledgment framework.

## FEATURE EXTRACTION

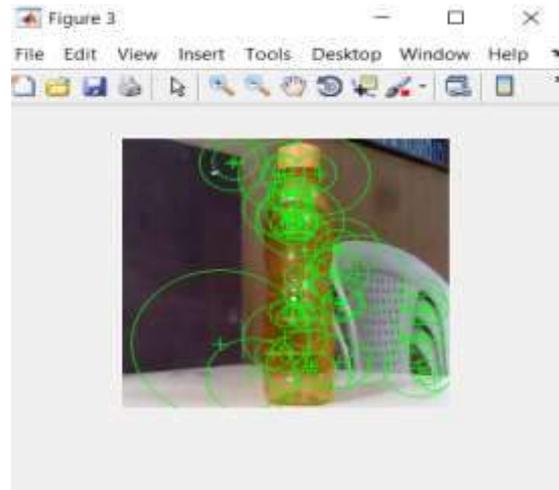
Highlight extraction may be a prepare of dimensionality decrease by which an starting set of crude information is decreased to more reasonable bunches for handling. A characteristic of these expansive information sets may be a huge number of factors that require a part of computing assets to handle.

- **SURF- SPEEDED UP ROBUST FEATURES**

In computer vision, speeded up vigorous highlights (SURF) may be a licensed nearby highlight locator and descriptor. It can be utilized for errands such as protest acknowledgment, picture enrollment, classification, or 3D recreation. It is somewhat motivated by the scale-invariant include change (Sift) descriptor. It is evident that the SURF descriptors or intrigued points of an picture contribute in an unexpected way on picture recovery. On the off chance that the weights or significance levels of the descriptors are received in the coordinating separate, the picture recovery can be more exact and successful. In reality, the weights can be assessed under the TF-IDF system by considering the Beyond any doubt descriptors as visual words, which in this manner has to construct a proper codebook as well as a word implanting in a common way under the BOW technique. Be that as it may, the time taken a toll of training a codebook and a modern word inserting cannot be attempted since the preparing dataset is so tremendous in our wine label picture recovery. In arrange to overcome this difficulty; we alter the TF-IDF remove into a disentangled frame which can be computed straightforwardly from certain presented capacities [1].



**Fig: 5** Extracted images



**FIG: 6** KNN CLASSIFIED IMAGE

## CLASSIFICATION

Picture classification alludes to a handle in computer vision that can classify an picture concurring to its visual substance. For illustration, a picture classification calculation may be planned to tell in case an picture contains a human figure or not.

- **KNN CLASSIFICATION**

The k-nearest neighbours (KNN) algorithm may be a straightforward, supervised machine learning algorithm that can be utilized to solve both classification and replace issues. It's easy to execute and get it, but includes a major downside of getting to be essentially moderates as the estimate of that information in utilize grows.

A directed machine learning calculation (as contradicted to an unsupervised machine learning calculation) is one that depends on labeled input information to memorize a work that produces a suitable yield when given unused unlabeled data. A classification issue includes a discrete esteem as its output. A relapse issue contains a genuine number (a number with a decimal point) as its yield. The KNN calculation accepts that comparative things exist in near nearness. In other words, comparable things are close to each other.

## IV. EXPERIMENTAL RESULT

Amid the assessment of the plan and improvement of Keen Sensor Based Strolling Adhere it was tried in practicable and genuine time conditions. It is also evaluated by blind person. There are different conditions on different routes are chosen to check the performance. In first route, we placed dummy of wall as obstacles in numbers. The daze individual was new with this put. At first blind man used the white cane on this route and comparative performance with white can has been evaluated. The route was 27m long in distance and it was covered at a speed of 0.522 m/s with help of white cane. But when blind man used smart stick it had been covered at speed of 0.78 m/s and with none problem. In the conclusion course appears that "Shrewd strolling adhere" has exceptional execution as compared to white cane. Likewise first route we got excellent results once we tested this stick in other routes also [2].

## V. CONCLUSION

In this work is for visually impaired people to reduce the suffering from day-to-day life. This proposed idea is an attempt towards progress the life of visually reduced public by providing mobility as well as safety measures without the dependency of others. The blind people is enabled to stay connected with surrounding environment by the help of the smart stick. They would be moving safer wherever they would wish to go without getting injured from the surrounding obstacles and hurdles. This idea can be improved further by adding additional sensors thereby increasing the utility factors of the stick and the applications.



## VI. FUTURE WORK

Objects location is utilized to discover objects within the genuine world from a picture of the world that are common within the scenes of a dazzle. Based on their areas, and the camera is used to distinguish any objects. We anticipate advance changes within the future as we create unused highlight sorts counting color, separate and other features. We also suggest utilizing this component Movidius Neural Compute Adhere (NCS) could be a profound learning USB drive. The NCS is fueled by the low-power high-performance Movidius Visual Handling Unit (VPU). Run numerous gadgets on the same stage to scale execution.

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## **QUESTIONS OF RESEARCH OF UZBEK MEDICAL TERMINOLOGY**

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### **ANNOTATION**

*This article discusses the features of using the terms pandemic, epidemic, quarantine, chilla in the Uzbek language.*

**KEY WORDS:** *medical terminology, various diseases, pathological situation, symptom and syndromes, artificial drugs, epidemic, medical devices and equipment, microorganisms, pandemic, quarantine.*

## **ВОПРОСЫ ИССЛЕДОВАНИЯ УЗБЕКСКОЙ МЕДИЦИНСКОЙ ТЕРМИНОЛОГИИ**

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### **Аннотация**

*В данной статье рассматриваются особенности использования терминов пандемия, эпидемия, карантин, чилла в узбекском языке.*

**Ключевые слова:** *медицинская терминология, разные болезни, патологические ситуация, симптом и синдромы, искусственные лекарства, эпидемия, медицинские аппаратуры и оборудования, микроорганизмы, пандемия, карантин.*



Глобализация человечества требует выработки глобальной коммуникации, прежде всего языковой. Необходима гармонизация медицинских словарей, терминов, тезаурусов, поскольку процессы интеграции человечества в глобальное сообщество тормозятся языковой разобщённостью, словами, засоряющими язык медицины. Недостаток взаимопонимания, неоднозначность в глобальном медицинском дискурсе приводит к неправильному лечению, появлению ятрогенных заболеваний. Выявление и преодоление разногласий в понимании медицинской лексики помогут в успешном применении новых методов в лечении и профилактике заболеваний.

Терминология в условиях ускорения научно-технического прогресса приобретает особое значение. Она является источником получения информации, инструментом освоения специальности. Любая область науки и техники находит своё выражение в терминах. Практически нет ни одной области знания, которую можно было бы изучать, не владея терминологией. Медицинская лексика объединяет специальные и неспециальные медицинские названия, функционирующие в научной и других подсистемах языка. Основную часть медицинской лексики составляет медицинская терминология. Медицинская терминология представляет собой специфический пласт лексики и в силу особенностей структурно-семантического, словообразовательного и стилистического характера отличается от общеупотребительных слов и, тем самым, занимает особое место в лексической системе языка. Несмотря на большое количество трудов, посвященных медицинской терминологии в отечественной, и в зарубежной литературе, лингвистический аспект изучения терминологической лексики всё еще нуждается в глубинных её исследованиях. Неисчерпаемость проблематики данного лексического пласта продолжает привлекать сегодня внимание лингвистов - исследователей к открытию её новых качеств, сторон, характеристик, особенностей как подсистемы языка. Медицинская терминология - это пласт лексического фонда со своими специфическими особенностями. В каждом профессиональном подязыке существует номенклатурная лексика, соотносимая с определенными реалиями и объектами. Особенность словарного состава терминологии заключается в том, что её номены представлены в ней шире, многообразнее, чем в других лексических подсистемах. Следует отметить, что на современном этапе медицинские термины широко распространены в разговорной речи, литературном языке, в сфере

здравоохранения, медицинской деятельности, науки. Дальнейшее развитие медицинской терминологии требует соответствующего исследования и упорядочения.[9]

По мнению профессора М. И. Чернявского, «неупорядоченность медицинской терминологии как в русском, так и в других языках продолжает оставаться серьезным препятствием при обмене научной информацией, при её машинной обработке, создаёт большие затруднения при адекватном научном переводе медицинской литературы»[10]

Одна из причин, по которой узбекская медицинская терминология, в целом вся медицинская терминология богата международными терминами, заключается в том, что с XVII-XVIII веков центр развития медицины переместился с Востока на Запад, особенно в Европу, и в связи с этим многие медицинские понятия - различные заболевания, патологии, симптомы и синдромы, лекарства, бесчисленное количество медицинских устройств и аппаратов, создание тысяч новых терминов с использованием лексических и аффиксальных (префиксов и суффиксов) элементов греческого и латинского языков для обозначения патогенных микроорганизмов требовали развитию терминологии [1, 237].

**ЭПИДЕМИЯ** [юн. эпидемия - грубая, широко распространенная (болезнь)] Необычно, широко распространенная инфекционное заболевание для определенного района. Например, эпидемия чумы. Таким образом, эпидемии гриппа наиболее распространены в городских районах. [2,43]

**Пандемия** (греч. *Pandemia* - вся нация <рап - целое, все + демос - нация] - массовое распространение эпидемической болезни в одной стране, нескольких странах, континентах или континентах [3,212].

Пандемия не объясняется в узбекских медицинских словарях. С лингвистической точки зрения «пандемия» - это гипоним слова «эпидемия», что означает более широкое понятие. Интересно, что пандемия очень похожа по форме на слова *pand*, *pand etok* - «обманывать», «обманывать и причинять вред» в нашем языке, поэтому некоторые из наших создателей используют это как словесную игру.

Человечество за свою историю пережило несколько пандемий. Самая страшная из них, так называемая «черная чума» (чума), распространилась в Евразии между 1347-1351 годами. На тот момент чума унесла жизни 75-200 миллионов человек в странах Евразии. В соответствии с законом 11 марта 2020 года Всемирная организация здравоохранения



объявила распространение вируса COVID-19 пандемией, подняла борьбу с ним до уровня высшей озабоченности и начала принимать меры по предотвращению его распространения.

«Карантин» на самом деле происходит от французского слова «карантин» и передается в узбекский язык через русский язык. В свою очередь, термин французский происходит от итальянского. По-французски «quarante» (произносится «кагонт») означает «сорок» (40), первое значение «quarantaine» - «около сорока», «сорок», «40 (+) лет», второе значение: «карантин» - (сорок дней) воздержание от определенных вещей, вложение [5]

Согласно французским словарям, слово «карантин» («карантин») использовалось в средние века для обозначения насильственного задержания судов, перевозящих пассажиров, товары или животных в порту. С самого начала это понятие имело медицинское значение и было введено отцом медицинской науки, греческим философом Гиппократом в V веке до нашей эры. Гиппократ считал, что любая болезнь проявится в течение 40 дней, а при некоторых заболеваниях он использовал практику заключения пациента в течение сорока дней. До Гиппократа Пифагор, живший в шестом веке до нашей эры, учил своих учеников, что «числа правят миром». Для пифагорейцев число «4» было важным символом изначальных основ мира, таких как четыре элемента (трава, воздух, вода, почва). Фактически, французское «quarante» или «сорок» также происходит от латинского «quadraginta», что означает «четыре раза по десять» (4x10).

В прошлом практика окружения пациентов, которую использовал Гиппократ, широко применялась в исламском мире, особенно нашими предками, и эта практика называлась «чилла» (персидско-таджикское «чил» («л») - «сорок»).") на персидском языке. Даже сегодня в народной медицине иногда используется «сидение чилла».

Чилла присутствует не только в медицине, но и в мистицизме, и также говорят, что сидение в чилле связано с тем, что дервиши уходят в узлат на сорок дней и занимаются молитвой. Алишер Навои пишет в «Насаим уль-Мухаббат», что шейх Низами Гянджеви просидел на дереве сорок дней. На самом деле, практика чиллы настолько укоренилась в нашей жизни, что, когда в нашем доме рождается ребенок, ребенок замерзает, невеста, которая входит в новый дом, простужается в течение сорока дней в начале нового этапа жизни и, наконец, сорок дней после смерти - важный период, согласно многим религиям, религиозные церемонии проводятся в честь кончины умершего. В связи с этим в книге

Абдувахида Хаита «Рождение слова: сорок дней карантина?» [8]

Слово «карантин» также возникло, как мы видели выше, на основе мистических, религиозных, исторических и даже научных идей, которые долгое время формировались вокруг числа «40». В древних внутренних науках число «сорок» считалось символом завершения процесса, определенного периода в сорок дней, сорок лет.

Таким образом, «карантин» означает не точный срок в сорок дней, а период завершения процесса. Сегодня слово «карантин» - международное слово, в некоторых языках оно французское, в других - итальянское. «Карантин» сегодня означает не «сорок дней», а «защита от инфекционных заболеваний».

В целом изучение узбекской медицинской терминологии стало требованием времени.

Термины и терминологии являются необходимым инструментарием для формирования научных теорий, законов, положений и репрезентируются как неотъемлемая и составная часть науки и техники. Ж.Г. Жигунова считает, что овладение терминологией является основной проблемой при постижении любого научного знания, т.к. терминологические единицы играют важную роль в профессиональной и научной коммуникации [7,10]. Действительно, специалист, работающий в определенной сфере человеческой деятельности, не сможет полноценно реализовать свои возможности, не овладев терминологией: в результате неудовлетворительной и неточной научно-технической терминологии возникают большие затруднения как для успешной хозяйственной деятельности, так и для деятельности обучающей, связанной с усвоением той или иной специальной дисциплины [7, 11].

Подводя итог вышесказанному, следует отметить, что узбекская медицинская терминология сложна в структурном отношении. Для узбекского языка словообразование как «путь развития состава языка особенно характерно ... благодаря особенностям его строя». Оно является мощным источником развития узбекской медицинской терминологии и тесно связано с тенденцией к языковой экономии в знаках, передающих содержание высказывания. Среди исконно узбекских и заимствованных медицинских терминов имеются сходные по архитектонике слова: простые, производные, сложные, а также терминосочетания двух типов: бинарные и многокомпонентные.

Медицинская терминология обогащается не только в результате заимствования лексики из



других языков, но и за счет использования собственных внутренних ресурсов языка.

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## PROBLEMS OF THE SKILLS OF TRANSLATION OF ART WORK

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### ANNOTATION

The article covers in detail the issues of mastery of translation of a work of art, a certain analysis of the translation of samples of Uzbek dastans is carried out.

**KEY WORDS:** original, translation, metaphor, national language, personage

## ПРОБЛЕМЫ МАСТЕРСТВА ПЕРЕВОДА ХУДОЖЕСТВЕННОГО ПРОИЗВЕДЕНИЯ

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### Аннотация

В статье подробно освещаются вопросы мастерства перевода художественного произведения, проводится определенный анализ перевода образцов узбекских дастанов.

**Ключевые слова:** оригинал, перевод, метафора, национальный язык, персонаж.

Со школьной скамьи нам твердили, что литература, не что иное, как образное отражение действительности. За той же скамьей нам пришлось читать множество произведений не только в оригинале, но и в переводе, при этом мы и не подозревали о том, всё ли в них образно. А сегодня, мало-мальски знакомый с оригиналом и

переводом, читатель не может без сожаления смотреть на переводы, где без разбору отождествляются «весеннее пробуждение природы» с обычным «пробуждением от ночного сна» («В крови» Ю.В.Чемземинли в переводе Т.Калягиной). Часто по переводам мы, читатели, судим о достоинствах и недостатках



произведений иноязычного автора. Под эстетической стороной перевода, как и оригинала, мы имеем в виду не только целостность художественного произведения, но и все его элементы, детали (события, предметы, персонажи, язык). Слова Озода Шарафутдинова о переводе очень точно отмечают роль перевода и его воздействие на читателей, а значит и на мировую культуру: «Родным языком создается каждый народ. Но только в результате переводов, деятельности людей, деятелей науки и просвещения, язык народа живет, развивается и поднимается на уровень мировой культуры» [1, 5].

Еще в XIX веке Л.Н.Толстой писал: «Самое важное в произведении искусства – чтобы оно имело нечто вроде фокуса, то есть чего-то такого, к чему сходятся все лучи или от чего они исходят. И этот фокус должен быть недоступен полному объяснению словами. Тем и важно хорошее произведение искусства, что основное его содержание во всей полноте может быть выражено только им» [6, 68]. Этим подчеркивается переводческое отношение к языку художественного произведения, который в состоянии обзреть все богатство и неповторимость жизни. Как известно, художественное произведение – это творение искусства слова, построенного из языкового материала. Переводчик, опираясь на все богатство и возможности переводящего языка, заново преобразует действительность, и от его умения владеть словом зависят степень полноты вновь воспроизводимой действительности и эстетического воздействия на иноязычного читателя. Конечно, в художественном переводе не принято говорить о «точности» соответствия перевода оригиналу, но в творческом мире свои законы точности и конкретности. Благодаря образности они становятся предельно реальными и осязаемыми. Известный английский переводчик эпохи Возрождения Джордж Драйден в предисловии переводов «Понтийских посланий» Цицерона писал, что настоящий переводчик должен иметь творческий уровень автора оригинала. Только в этом случае он может перевоплощаться в него (автора) и дать точную обрисовку всего, что ему дано о жизни.

А.С. Пушкин негодовал, когда оппоненты обвинили его в неправомерности употребления таких метафор и метонимий, как «неверный лёд, камень дышит, ревнивое подозрение, молодой свежий поцелуй, стакан шипит» и пр. А на самом деле, благодаря ясности и точности языка предметы и явления преобразуют конкретно-чувственный облик. Вместе с тем, это не означает, что переводчик,

под видом эквивалентности, с фотографической точностью должен передавать образы предметов и явлений [5]. Вспомним определение внутренней формы слова, данное В.В.Виноградовым еще во второй половине XX века: «Внутренняя форма слова, образ, лежащий в основе значения или употребления слова, могут уясняться лишь на фоне той материальной и духовной культуры, той системы языка, в контексте которой возникло или преобразовалось данное слово или сочетание слов» [3, 20]. Итак, переводчик должен не только знать язык оригинала, но и достаточно иметь знания о духовной и материальной культуре народа, на языке которого было создано произведение, подлежащее переводу.

Общеизвестно, что каждый язык обладает своеобразными способностями обобщения, специфическими красками обозрения (сравним: русский язык- «ночь погрузилась в нескончаемые кошмары» – и узбекский язык: «*tun qo'rqincli edi*», «*tog'larda yomg'ir ayamay quydi*» - «в горах шёл проливной дождь» И.Меликзаде).

Конечно, понятия конкретности или точности в художественных и научных текстах кардинально отличаются. Во-первых, художественное произведение индивидуально и конкретно. К тому же искусство выражения в полном объёме проявляется именно в литературно-художественном материале. По этому поводу справедливо заметил американский ученый Эдуард Сепир: «Научная истина не индивидуальна, она по сути дела, не окрашена тем особым языковым средством, в котором она воплощена... Таким образом, подлинное средство научного выражения есть своего рода обобщенный язык, своего рода символическая алгебра, по отношению к которой все известные языки – только переводы. Можно адекватно переводить научную литературу, потому что оригинальное научное выражение само есть перевод» [8].

Итак, литературный текст характеризуется свойством и строением своей матрицы. Причём каждый национальный язык таит в себе «совокупность специальных эстетических фактов» – фонетических, ритмических, морфологических, словообразовательных и прочих. Автор, вслед за ним и читатель оригинала, может до конца осознавать степень связанности произведения с этой матрицей. Но как только ставится вопрос о переводе этого произведения на другой язык, природа оригинальной матрицы сразу дает о себе почувствовать [9, 175].

Как считают представители татарской лингвокультурологии, интересным материалом для изучения культурологических аспектов



номинации являются слова именно с образной семантикой, это касается эмоционально-оценочных наименований, в основу которых кладется некоторый образ-эталон, относящийся либо к сфере положительного, либо к сфере отрицательного [7, 59]. Ими написан «Этнокультурологический словарь татарского языка», данный в приложении к книге «Теоретические и прикладные аспекты татарской лингвокультурологии», где дается этнокультурологическое описание слов, так необходимое для переводчика [7, 244-348]. Так к любому слову из этого словаря приводится этимология, даются прямые и переносные значения слов, некоторые дериваты, в качестве иллюстративного материала служат фразеологизмы, пословицы, поговорки, песни, произведения художественной литературы.

Специфика каждого национального языка, проявляющаяся в метафорах, метонимиях, сравнениях и прочих тропах, требует к себе особой чуткости и умения. Хотя во всех языках образность таких выражений сопряжена с чувственным и в первую очередь, зрительным восприятием предметов и явлений, но все же, они выражаются своими специфическими средствами и красками. Они мотивируют значения этих фраз и придают им эмоциональную экспрессивность и оценочность – богатством красок, типичной национально-культурной палитры (например, в узбекском языке *kulni qoqtoq* – в русском языке *тянуть ляжку*; в русском языке *родиться в сорочке* – в узбекском языке *ko'ylak bilan tug'ilgan( omadi bor ekan)*). Переводчик художественного текста не просто имеет дело с национально-специфическими особенностями языка оригинала. Ему необходимо внутренне почувствовать стиль автора, уловить тонкости его неповторимой манеры письма. Ведь каждый художник слова, являясь представителем конкретной национально-культурной эпохи, обладает резко очерченной индивидуальностью языка и слога.

Приведем отрывок из дастанов:

Keldi dilimga bir so'z hikoyat,  
Tojil qasosidan bo'lmush rivoyat,  
Majnunni ohi Layliga yeti,  
Najrida qildi qo'b phu voyat.

Layli dedikim bir kun borayin,  
Majnun g'aribni istab topayin,  
Chiqdi uyiddin, dasht uzra yurdi,  
Majnunni joyi anga ko'rindi.

Пал мне в сердце один рассказ,  
Со слов «венца рассказчиков».  
Вздохи Меджнуна до Лайли дошли:

В разлуке с нею издал он много стонов и воплей.

Лейли сказала: «Когда-нибудь пойду,  
Бедного меджнуна поищу и найду».  
Вышла из дому, по пустыне пошла,  
Место, где был меджнун, стало ей  
видно.[9]

Переводчик С.Васильев хотя и сохранил иронический тон оригинала, но не смог передать всю гамму красок узбекского дастана.

Приведенные примеры показали, что в процессе переводов изобразительных средств художественного текста переводчик больше всего испытывает трудности сохранения метафор и различных переносов. Именно метафоризация обеспечивает расширение смыслового объема слов, появление новых, дополнительных оттенков. Как правило, в них заключено национально-специфическое и неповторимое индивидуально-авторское. Этим определяется уровень сохранения художественно-эстетического своеобразия переводимого произведения. Исследование эмоциональных концептов даст возможность выявить универсальное и специфическое в способах познания окружающего мира, что позволит глубже изучить систему мышления носителей языка для переводчика, что представляется очень важным и нужным. Еще А. Вежицкая в своих работах рассматривает проблему существования «базовых человеческих эмоций» и говорит, что концептуализация мира эмоций каждой культурно-языковой общностью осуществляется по-своему. Так чувства, называемые русскими **грусть, тоска**, значимы в системе лексических единиц русского языка, в русской языковой картине мира, в некоторых западных языках, например, нет точных эквивалентов для их выражения. Поэтому отсутствие единых базовых когнитивных сценариев, описываемых единицами какого-либо конкретного языка, создает трудности и сложности при переводах с одного языка на другой язык [3, 30].

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## **FEATURES OF TEACHING THE LATIN LANGUAGE AT A MEDICAL UNIVERSITY**

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### **ANNOTATION**

*Studying the Latin language course pursues a purely professional goal - to prepare a terminologically competent doctor. Memorizing words is one of the most important components of Latin lessons. It is the Latin vocabulary that will help in the future work with medical terminology. In addition to medical terminology, the class also pays attention to Latin aphorisms, the knowledge of which helps students not only learn centuries-old wisdom, but also better memorize Latin words.*

**KEY WORDS:** *medical terminology, Latin aphorisms, dictionary form of Latin words.*

### **ОСОБЕННОСТИ ПРЕПОДАВАНИЯ ЛАТИНСКОГО ЯЗЫКА В МЕДИЦИНСКОМ ВУЗЕ**

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### **Аннотация**

*Изучение курса латинского языка преследует сугубо профессиональную цель - подготовить терминологически грамотного врача. Заучивание слов - одна из важнейших составных частей*



занятий по латинскому языку. Именно латинская лексика поможет в дальнейшем работе с медицинской терминологией. Помимо медицинской терминологии на занятиях также уделяется внимание латинским афоризмам, знание которых помогает студентам не только узнавать многовековую мудрость, но и лучше запоминать латинские слова.

**Ключевые слова:** медицинская терминология, латинские афоризмы, словарная форма латинских слов.

The Latin language has been and remains one of the most essential disciplines in the training of a physician and pharmacist. The Latin language began to develop from the 6th century BC. It was based on the dialect spoken by the inhabitants of Rome. In those days, the "Eternal City" was the capital of the region called "Latium". It is from the name of this area that the name of the language comes from.[1,140]

As the power of Ancient Rome grew, the Latin language spread more and more. It covered all Roman colonies and possessions. Moreover, their inhabitants spoke Latin not only under duress - the Latin language for them was a conductor of a higher culture. It should be borne in mind that the ancient Greek (and modern Greek) language, together with Latin, belong to the family of Indo-European languages, which also includes Slavic, Baltic, Indian, and Iranian languages. All Indo-European languages have a common origin from one base language. Terminology of Greek-Latin origin is easily assimilated into all these languages, often through intermediary languages, primarily through English. The traditional centuries-old effective use of not only the vocabulary and derivational means of the two classical languages, but also their typical structures, word-formation models is explained, first of all, by the history of the emergence and development of medical practice and medical knowledge in Europe.

It was the Greeks and Romans who created the first works on medicine.

The most famous of the ancient Greek doctors is the famous Hippocrates (460-377 BC). Hippocrates is the author of many works on medicine, these are: "Aphorisms", "Prognosticon" (it presents the general properties of the disease), "Epidemics" (a description of the course of diseases is given), "On human nature" (here the theory of four states (or liquids): "Blood", "phlegm", "yellow bile" and "black bile"), as well as the "Oath" (better known as the "Hippocratic Oath").

The "Hippocrates Collection" includes the works of not only Hippocrates and his students, but also doctors representing other areas of ancient Greek medicine. The history of European medicine and medical terminology actually begins with the "Hippocratic Collection".[2,36]

From the "Hippocratic Collection", often through subsequent romanization, such names as

nephritis, paresis, bronchus, urethra, acromion, carcinoma, polyp, typhus, epidemic and many others came to scientific medicine. Latin and Greek, having laid the foundations of world scientific terminology, still serve as a foundation for the creation of new and new terms.

Learning Latin is hard work and cramming. And from the first lesson, students should be oriented towards serious efforts in comprehending Latin. Studying the Latin language course at a medical university pursues a purely professional goal - to prepare a terminologically competent doctor. However, students have the opportunity to improve their cultural and educational level, broaden their horizons.

It is necessary to familiarize students with the main milestones in the development of the professional language of a doctor, the specificity of terms and terminology, the basics of medical terminology, etc. When students in other subjects begin to easily recognize and understand scientific terminology, built on the already familiar Latin roots and according to the rules of Latin word formation, they are constantly convinced of the usefulness and necessity of Latin for their own education.[3, 78-79]

The main task of training at a medical university is to train qualified medical specialists, which is unthinkable without mastering special terminology. Terminology (from Latin terminus - limit, border and Greek logia-science) are words or phrases denoting certain concepts in the naming system used in a given field of knowledge. A scientific concept is the result of theoretical generalization, its meaning is revealed in the definition (from the Latin definition - definition). "To understand the essence of a scientific concept means to have knowledge about the relationship of a given concept (term) with others, about its place in the system of concepts (terms) of a given science" (MN Chernyavsky).[6,55]

Terminological training of future doctors involves not only an understanding of terminology, but also practical skills in its active use.

When teaching Latin, it is important to never lose sight of the motivation for learning this language, both conscious and subconscious.

First of all, this should be served by the introductory lecture at the beginning of the course. In this lecture, in addition to showing the role of Latin



in the history of world culture, the history of the language itself, the history of its study, etc., the moments that directly interest students, stimulating their desire to learn Latin, should be especially highlighted.[4,80]

These include the beauty of the language itself, expressing deep truths in a short aphoristic form. An important stimulating factor is the growing philological education of students, which allows them to treat differently the study of other languages. Constant work with derivatives in new languages leads to a more meaningful knowledge of the vocabulary of English, French, German and other languages. Previously unknown, confused and incomprehensible words now acquire an etymological "transparency", which allows one to guess or simply understand the meaning of the first encountered word. All this should be constantly noted by the teacher to increase motivation in learning Latin. The grammar of the Latin language is introduced gradually, from simple to complex. The most important elements of Latin grammar - declination of names and conjugation of verbs - are fixed throughout the course, in the form of exercises for declension and guessing or the formation of the desired verb forms. A constant principle of working with Latin grammar should be a comparative analysis of the grammatical categories of Latin with the corresponding phenomena in Russian and other languages. This work, useful in all respects, allows one to consciously, and not only through mechanical memory, master the basics of Latin grammar. In addition, it enriches the understanding of Russian and foreign languages, starting from Latin - the language par excellence.

From the very beginning, one should be taught to use Latin grammatical terminology (participium instead of "participle", infinitivus instead of "indefinite verb", perfectum instead of "past tense, etc."). This must be done, firstly, because of the impossibility of sometimes using Russian equivalents due to their inadequacy to Latin ones; secondly, it is important to master the international linguistic terminology, built entirely in Latin.[5,90]

Memorizing words is one of the most important parts of Latin studies. It is the Latin vocabulary that will help in the future work with medical terminology. From the very beginning, all students should have special notebooks for writing down words. Each page is drawn into three columns, in the first the word itself is written in its dictionary form, in the second - its Russian translation, in the third - derivatives of this word in Russian and well-known foreign languages.

Words must be memorized in their vocabulary form, i.e. nouns - in nominative and genitive with

gender indication; adjectives I-II declensions - in three genders, III declensions - in three or two forms (for adjectives with three and two endings) or in nominative and genitive, if these are adjectives of one ending. A certain automatism of knowledge of grammatical forms, necessary for orientation in anatomical, pharmaceutical, and clinical terminology, requires cramming, which is indispensable here. It takes a lot of time and effort to memorize words, perform exercises. Experience shows that the weakening of the requirements in some part of these classes leads to the accumulation of incompletely learned materials, and this, in turn, to the student's confusion in the face of more and more incomprehensible medical terms. The lexical minimum, presented in the textbook in the amount of about 900 units (words and term elements), is designed for lasting memorization at the level of long-term memory. When selecting it, a number of principles were taken into account, primarily the frequency of use, thematic importance and derivational valence.

Memorization develops memory. The words of a new language must be learned, so as not to look for every word in the dictionary, it is also clear. But is it necessary to learn the numerous Latin aphorisms that we give at the beginning of each lesson? In our opinion, it is necessary. First of all, because Latin is a dead, non-spoken language, and the aphorisms spoken in Latin are almost the only living element of Latin. Remaining in the memory for a long time, they will again and again reproduce in the consciousness of the one who once learned Latin its pronunciation and grammatical norms, live on the lips and in memory.

In addition to the centuries-old wisdom that is captured in these aphorisms, memorizing them is very useful for the current study of Latin. Firstly, many words become learned in this way, and secondly, the grammatical rules on which this aphorism is built are stored in memory. For example, having learned the aphorism "Per aspera ad astra" - "Through hardships to the stars", the student has every chance to remember that in the adjective asper -e- refers to the stem and does not drop out in declension, that "star" in Latin is not astra, - ae f, a astrum, -in, that ad requires the accusative after itself and that the neuter in the second declension in the accusative plural has, according to the neuter rule, the ending - a.[7,32]

And what can we say about the joy of mastering these aphorisms in the language of the original! Their repetition turns into a fun competition every time, who knows them more and more accurately. Certain Latin aphorisms and sayings relate to issues of life and death, human health, doctor's behavior. Some of them are medical



deontological precepts, for example: *Salus aegroti suprema lex medicorum*. - The benefit of the patient is the highest law of doctors; *Primum noli nocere!* - First of all, do not harm! (The first commandment of the doctor). Thus, through the study of the Latin language, the student provides himself with a painless entry into medical terminology, as well as a complete understanding of the meaning of foreign and domestic cultural terminology.

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# **GOVERNMENT INTERNAL AUDITS IN ETHIOPIA: AN IDENTIFICATION OF LAW AND PRACTICE RELATED CHALLENGES (A CASE OF TIGRAY REGIONAL GOVERNMENT BUREAUS)**

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## **ABSTRACT**

*The researcher's experience as internal auditor and other similar studies on internal audit indicate that government Internal Audit Units in Ethiopia are yet less effective and more of old-fashioned in terms of their services. Therefore, there is urgent need of more specific study at micro-level in order to improve the effectiveness of the internal audit units. This work tried to identify the major law and practice – related challenges that government internal auditors face in discharging their duties at regional level. Using a sample of 40 internal auditors in Tigray Regional State, this study examined the law and practice related challenges which government internal auditors are encountering in executing their duties. The primary information included in this research is collected through a survey conducted using detailed questionnaire and interview with some internal audit process owners and bureau heads and/or deputy heads. The study indicated that the major challenge is less management support provided to the Internal Audit Units. Absence of other IA effectiveness factors like Independence and Competence are also found as challenges. But there aren't prominent laws – related problems identified in the study. Based on the weaknesses identified, managements of governmental bureaus in Ethiopia in general, are recommended to provide necessary supports and trainings to their Internal Auditors so as to help them discharge their responsibilities effectively and provide value – adding services.*

**KEY WORDS:** *Internal audit, challenges, value –adding, effectiveness, practice*

## **INTRUDUCTION**

### **BACKGROUND OF THE STUDY**

Internal auditing has evolved as systems, transactions, and processes have turned out to be more complex and its initial accounts date back to the Mesopotamian civilization (IIA Research Foundation 2009). Auditing has two broad classifications – internal and external auditing. Internal auditing is basically an independent evaluation unit established by

management for the appraisal of operations. Studies (example J. Kinfu 2006, Cohen and Sayag 2010) discussed internal audit as the solidest means of checking ethics and governance in public organizations and private entities According to them, the aim of internal auditing is to improve organizational efficiency and effectiveness through useful criticism.

More specifically, (Belay 2007) discussed that government auditing is a foundation of good public



sector governance. By providing impartial, objective valuations of whether public properties are responsibly and effectively managed to achieve intended results, auditors help government organizations achieve responsibility and reliability, improve operations, and instill confidence among citizens.

Internal auditing in Ethiopia also has long history. Its beginning in Ethiopia dates back to about the middle of the 1940s and it had its first legislative root in the Constitution of 1923 which authorized the establishment of an Audit Commission Articles 34 (MoFED 2005).

However, many studies (Mengist and Mihret 2011, Mihret and Yismaw 2007, Mihret and Woldeyohannes 2008, Belay 2010, and Admasu and Mihret 2011, Fareed Mastan *et.al.* 2015) indicate that internal audit in Ethiopia was merely financial audit focused and didn't show the intended development despite its long history.

Most of the prior auditing researches, (eg. Mihret and Yismaw 2007, Belay 2010) examined the effectiveness of Internal Audit Functions in Ethiopian public enterprises. Other few researches, (eg. Admasu and Mihret 2011), examined Reliance of External Auditors on Internal Audit Work. (Mihret and Woldeyohannes 2008) also examined value – added role of internal audit in a public corporate.

However, research examining the law and the practices of internal auditing units and identifying the sources for their inefficiencies has been negligible. To identify specific reasons of internal audit ineffectiveness in government offices in Ethiopia, this research assessed the existing audit work environment (the law), the auditors' proficiencies and the auditors' independence and management support (the practices) in *eight government bureaus in Tigray*.

## LITERATURE REVIEW

### INTERNAL AUDIT: AN OVERVIEW

Originally, internal auditing was presented as a surveillance instrument intended to protecting company assets and checking dependable accounting information (Arena *et al. nd.*). In the later years, however, the role of internal audit has grown significantly in importance in relation to its role in terms of monitoring internal control and financial compliance and integrity and toward a wider internal consultative role within the whole risk management function of its host entity. More recently, financial dishonors and the related reforms attracted new attention on IA as one of the vital constituents of corporate governance and it has been increasingly looked as a possible response to external pressure of reducing information irregularity between upper management and stakeholders.

(Cohen and Sayag 2010) state that Internal auditing (IA) serves as an important link in the business and financial reporting processes of corporations and not-for-profit providers. Moreover, Goodwin-Stewart and Kent (2006) describe that internal auditors play a key role in monitoring a company's risk profile and identifying areas to improve risk management. The aim of internal auditing is to increase organizational proficiency and value by constructive criticism. (Eden and Moriah 1996) as cited in Aaron (Cohen and Sayag 2010) identified four main components IA: (1) verification of written records; (2) analysis of policy; (3) evaluation of the logic and completeness of procedures, internal services and staffing to assure they are efficient and appropriate for the organization's policies; and (4) reporting recommendations for improvements to management..

(Rupsy 2008) discussed that today internal auditing is treated as an internal organizational function that integrates activity of reasonable assurance and consulting, which is based on structural, well-grounded and standardized approach for evaluating effectiveness of internal control, risk management and corporate governance.

### INTERNAL AUDIT QUALITY FACTORS: OBJECTIVITY, COMPETENCE AND MANAGEMENT SUPPORT

#### OBJECTIVITY/ INDEPENDENCE

The IIA defined *Objectivity* as “An unbiased mental attitude that allows internal auditors to perform engagements in such a manner that they have an honest belief in their work product and that no significant quality compromises are made. Objectivity requires internal auditors not to subordinate their judgment on audit matters to that of others.” And alternatively, independence can be generally defined as *freedom from dependence on, or influence or control by, another person, organization, or state*.

#### COMPETENCE

(Al-Shetwi *et al.* 2011) discussed competence as proficiency and due care and it is measured by academic background, specialization, continuing professional development, experience in auditing, and knowledge of computer aided audit programs. Moreover, The IIA's standard 1210 on proficiency of the auditor, as cited in (Mihret and Yismaw 2007), requires that the internal auditors possess the knowledge, skills and other competencies needed to perform their responsibilities (IIA 1999b).



Office of Federal Auditor General, (OFAG 2009), divides these Professional competences into two phases as Attainment of professional competence which requires a high standard of general education followed by specific education, training and examination in professionally relevant subjects and a period of work experience and Maintenance of professional competence which requires a continuing awareness of developments in the accountancy profession.

### MANAGEMENT SUPPORT

(Dessalegn and Aderajew 2007), discussed management support to IA as any of the elements of IA's characteristics and the importance of management's dedication to implement audit findings and recommendations to serve the purpose. (Mebratu 2015) also recommended that internal audit section heads have to organize internal audit plans and actions with management, external auditors, and other evaluation organizations to certify that most operational audit coverage is realized and duplicate of the determination is reduced.

### CHALLENGES OF INTERNAL AUDITORS

Internal auditors face bigger challenges; growing stresses from stakeholders, professional fraud and unexpected cyber-attacks. In addition, (Warga 2006) has identified some major problems attached with public internal auditors including less support of senior government managers and executives, providing non-audit services, less Cooperation of officials during review and political pressures during reporting process.

### IMPORTANCE OF THE STUDY

Being an extension of some researches on internal audit in Ethiopia in different sectors, this study, regardless of its investigation scope, the results of the study are expected to achieve a great external acceptability because all government internal audits in Ethiopia function within the same legal setting. It also tries to identify the major problems of the existing IAUs and so that respected body can take corrective actions based on recommendations forwarded.

### STATEMENT OF THE PROBLEM

Despite the above discussed roles internal audit plays, the researcher's observations from his 3 years' experience as internal auditor and many studies (eg. Admasu and Mihret 2011 and Belay 2007) have shown that internal audit sections in governmental organizations in Ethiopia are yet nominal and more of traditional type. This weakness, unless solved, will influence largely on economic transparency and

governance matters in the public sector and therefore requires specific study in order to improve the effectiveness of the internal audit section. It's this issue that motivated the researcher to undertake detailed study on this topic.

### OBJECTIVES OF THE STUDY

The general objective of this research project was to assess the major law related and implementation challenges associated with government internal auditors in Ethiopia with special reference to eight Bureaus in Tigray Region and the specific objectives are:

1. To determine whether internal auditors perform their duties objectively.
2. To see whether internal auditors own the required level of proficiency.
3. To ascertain the perception of top management towards internal audits
4. To evaluate whether the law complies with international laws.

### RESEARCH QUESTIONS

This work tried to identify the major challenges (law borne and implementation - related) that government internal auditors face in discharging their duties by raising the following basic questions:

1. Are internal auditors performing their duties objectively and independently?
2. Do internal auditors have the required competence and proficiency?
3. Do internal auditors get sufficient top management's support?
4. Does the law comply with the IIA guidelines?

### RESEARCH METHODOLOGY

#### RESEARCH DESIGN

The descriptive survey research method is employed to study the problem. It is used because the method is believed to provide precise information concerning the major challenges of internal audits in government sectors related to practice and the law.

Therefore, in order to identify and analyze the existing problems of IAFs, compare its existing condition with the reviewed research findings of the past and to draw a general conclusion of the study, the researcher is interested to use this research method of the study. Qualitative research methodology is also employed as a supplementary to the study with the information gained from the open ended questions and interview responses.



## **SAMPLE, SAMPLING TECHNIQUE & DATA COLLECTION METHODS**

The researcher adopted the survey type of research in which a sample from the target population was used for the study. Totally, sample of 8 Bureaus Internal Audit Sections were selected from the target population of 95 Internal Audit Sections. The study used a judgmental sampling technique to select elements; i.e Internal Audit Functions with greater number of employees.

The primary information included in this project is collected through a survey conducted using detailed questionnaire and interview with some internal audit department/process owners. The survey is conducted with the goal of assessing the major challenges government internal auditors encounter in discharging their duties. Structured questionnaires were sent to 40 internal auditors and 24 management staff members at Tigray Bureau of Plan and Economic Development, Tigray Bureau of Education, Tigray Bureau of Water Resources, Mine and Energy, Tigray Health Bureau, Tigray Bureau of Agriculture and Rural Development, Tigray Housing Development Agency, Tigray Rural Roads Authority and Mekelle City Finance Office.

But because most of the management staff members were reluctant to fill the questionnaires because of work load, data from these sources was not used in the analysis and only data gathered from the internal auditors was used for this study. And therefore, the information is limited to the internal auditors' responses only. And out of the 40 auditors, only 34 (85%) filled and returned the questionnaires.

## **RESULTS AND DISCUSSION INTERNAL AUDITOR'S OBJECTIVITY AND/OR INDEPENDENCE**

Overall administrative independence is important in making auditing activities more smooth and effective. In line with this, (Avianti 2009), discussed that in situations where the IAF is independent, in terms of reporting level, an improved control environment and reduction in reporting errors result.

In this study, *six items* were used to assess the level of objectivity of the internal auditor in each bureau and/or organization. Table (1) provides the results of the questionnaire concerning the fulfillment of the internal auditor objectivity attribute in their respected offices. As can be seen from the table, the overwhelming majority of the respondents agree the presence of objectivity attributes like freedom of internal auditors to access all parts of the company, the independence of the internal audit department from

other departments in the organization, freedom given to internal auditors to implement the necessary internal audit procedures, and auditors' ability to report to relevant government authority when officials in the organization abuse their power against public interest, lose their integrity and honesty, and withhold key information to stakeholders.

This is contrary to (Belay's finding 2007) which revealed that organizational structures don't allow internal auditors to report when officials in the organization ill-used their authority contrary to public interest, lose their reliability & morality and when officials reserve crucial information to the public. This difference in results might come from the improvements made to the reporting lines of the internal audit function and due to full application of audit rules and laws in the country.

(Mihret and Yismaw 2007) argued that independence of individual auditors could be achieved by auditor cycle and not assigning auditors to engagements with which they had relationships that are believed to compromise objectivity but opposite to this, 50% of the respondents disagree with this idea in this study. Most questionnaire responses and interview results showed that the internal audit dept. is forced to participate in some routine activities like the preparation of the company's financial statements and accounting records and reasons for this were that it is because, except the IAUs in BoFED, Housing Development Agency, and Rural Roads Authority, all the expenditure and other sections in all the other bureaus are new and therefore require auditors' supports in every financial activities. However, (Belay's study 2007) in public organizations where the IAUs were not new also supports the presence of auditors' participation in audits of their activities in Ethiopia. Therefore, from this it can be concluded that the main reason for internal auditors' engagement in some routine activities is not the newness of the IAUs; it is because the existing style in Ethiopia. Generally, median of the respondents' answers for most items of this attribute are high reached to 4 indicating that at least half of the respondents agree with issues raised but the median to item 4 is "2" which means that greater than half of the respondents disagree with the availability of nonparticipation in audits of their own works.

Further, One important point to be noted from the summarized responses is that even though the majority of the respondents (16% + 47%=63%) agree with item number 6, respondents with significant percentage (34%) neither agreed nor disagreed with the idea raised. This shows that either they are not allowed to do their duties as per the standard or they are not



aware what the law says or there may be any fear that makes them not to tell the truth.

### Questionnaire responses – Auditors’ Objectivity and/or Independence

Items	SA (5)	A (4)	NI (3)	D (2)	SD (1)	M
1. Auditors conduct audit activities in accordance with auditing standards	8(25%)	22(69%)	2(6%)	0	0	4
2. Internal auditors have free access to information about the organization and unrestricted access to its site.	9(28%)	16(50%)	4(13%)	3(9%)	0	4
3. Internal auditors operate totally independently and can audit any issue they consider worth auditing	10(31%)	10(31%)	7(22%)	4(13%)	1(3%)	4
4. Internal auditors do not participate in audit of activities for the operation of which they were responsible.	3(9%)	9(28%)	4(13%)	12(37%)	4(13%)	2
5. Internal auditors are free to implement any internal audit procedures which they believe are necessary.	3(9%)	22(69%)	5(16%)	2(6%)	0	4
6. The internal audit unit in your organization can report to relevant government authority when officials in the organization abuse their power.	5(16%)	15(47%)	11(34%)	1(3%)	0	4

Source: Questionnaire results, 2018

### INTERNAL AUDITOR’S COMPETENCE

Internal Audit Profession Assurance, Control and Risk Team (2007), defined competencies as groups of manners, abilities and familiarity desirable to carry out a job effectively.

To assess availability of this requirement, *four factors* were used in this survey. Table (2) provides the results of the questionnaire concerning the level of internal auditors’ competence and/or proficiency in units studied. As can be seen from table 2 below, the overwhelming majority of the respondents believe that most competence factors such as the educational level, professional experience of internal audit, the level of preparation and technical training are more or less maintained in their respected offices; i.e. *median*  $\geq 3$ .

General view of the summarized responses below show that the median values of the respondents’ answers of this field reached between 3 and 4

indicating that most respondents accept the availability of each factor in their bureaus and/or organizations.

57% of the respondents don’t agree with the ability of internal auditors to use Computer Assisted Auditing Techniques (CAATs) which is contrary to the literature. However, literatures, (eg. The Ethiopian Government Auditing Standards, 2006) discuss that an auditor must be qualified, academically and practically and have specialized skills to enable him to implement the audit process in an environment of accounting information systems.

Majority, (53%), of the respondents to item “2” which says “Internal Auditors possess the required professional experience of internal audit” were abstainers. i.e they neither agree nor disagree with the idea raised. Interview results for this show that it’s because the standard is not stated in number of years in auditing standards of the country.

**Questionnaire responses –Auditors’ Competence**

Items	SA (5)	A (4)	N (3)	D (2)	S D (1)	M
1. Internal auditors possess the required educational level.	11(34%)	17(53%)	4(13%)	0	0	4
2. Internal Auditors possess the required professional experience of internal audit.	6(19%)	7(22%)	17(53%)	2(6%)	0	3
3. Internal auditors participate in training and development programs to maintain their skills and keep up to date in the field.	3(9 %)	19(60%)	8(25%)	2(6%)	0	4
4. Internal auditors have the ability to use CAATs.	1(3%)	5(16%)	8(25%)	13(40%)	5(16%)	2

Source: Questionnaire results, 2018

**QUALITY OF AUDIT WORK**

Quality of audit tasks is one of the most noticeable issues on which internal audit effectiveness is attached (AICPA 1991, Mihret and Yismaw 2007). The IIA standards also require the IAU's principal audit executive to develop and preserve a quality assurance and enhancement method that comprises periodic internal quality valuations of the IAU and continuing internal checking [IIA 2003b]. The IIA International Professional Practices Framework (IIPPF 2011a) also offers compulsory regulation to internal an auditor that defines the model for the IAU to adhere and how an IAU should work.

Taking in to account this notion, *six items* were included to assess the availability of the required quality of internal audit work in the bureaus and/or organizations surveyed. Table (4) provides the results of the questionnaire concerning internal audit work quality given by internal auditors to each factor. As can be seen from the table below, except for audit coverage and regular follow up by internal audits on audit findings, the overwhelming majority of the respondents agree with factors such as adequacy of the extent and scope of the internal auditor work, due audit care by internal auditors when performing their duties, time spent in auditing, scope of audit plans, and quality of audit reports.

Interview results also showed that most of the audit works stick on audit activities of procurement, finance and property management process and more specifically on checking of the accuracy of financial statement balances and the procedures followed to prepare them rather than to consult the management on

risk management issues. Results of (Mihret and Yismaw 2007) also revealed that internal auditors are involved in a range of audit assignments – financial audit, compliance audit, and performance audit. As discussed above, results of assessment of this attribute i.e. audit coverage revealed that auditors stick only on the traditional audit activities specific processes because of little knowledge of the activities of the other processes. This problem is severe in Bureau of Water Resources, Mine and Energy, Bureau of Health and Rural Roads Authority.

The second factor that needs discussion here is the regular follow up made by internal auditors to examine whether actions are taken by management to correct the problems reported. As can be seen from the questionnaire results, 62% of respondents disagree with the idea raised. Interview results show that reasons for this are different among the respondents. Some say that it is because it is not their mandate and others say that it is because management perceives this as unhelpful activity and hence they feel upset. But it is stated in the internal audit manual that follow up responsibility is the auditors’ responsibilities.

**Questionnaire responses – Internal Audit Work Quality**

Items	SA (5)	A (4)	N (3)	D (2)	S D (1)	M
1. Audit plan is determined completely by the internal auditors.	12(38%)	15(47%)	3(9%)	2 (6%)	0	4
2. Internal audit work covers all processes and matters	4 (12%)	6(19%)	5(16%)	14(44%)	3(9%)	2
3. Internal audit's plan includes testing of internal controls and compliance work.	9(28%)	15(47%)	6(19%)	2(6%)	0	4
4. Each audit duty examines sufficient number of items.	3(9%)	18(56%)	7(22%)	4(13%)	0	4
5. Internal auditors take due care when performing auditing.	10(32%)	18(56%)	3(9%)	1(3%)	0	4
6. Internal auditors spend sufficient time in auditing	12(38%)	18(56%)	2(6%)	0	0	4

Source: Questionnaire results, 2018

**MANAGEMENT SUPPORT**

Studies of (Mihret and Yismaw 2007, Albercht *et al.* 1988) indicate management support as a key element of internal audit effectiveness and the method through which senior management pursue their support for internal audit is likely to provide an important indicator as to the role and value of internal audit all over the organization.

Understanding the significance, an assessment of this attribute was made by constructing **eight parameters** and results of this parameters show that auditors in the studied units get less management support as discussed briefly in the following paragraphs.

None of the respondents replied “Strongly Agree” to the paragraphs: “Management allocates sufficient fund for annual training and development of the internal audit staff members, Salary levels are sufficient to allow the organization to attract and retain auditors with the required professional skills and qualifications, Quality assurance & improvement programs exist and Auditees (organizations and/or processes being audited) regard internal audit as a value adding service.” Only few respondents (4, 3, 4, and 8 respectively) replied “Agree” and most respondents (56%, 56%, 72%, and 41% respectively) replied “Disagree” and “Strongly Disagree” for each of the above listed paragraphs. The median of the responses for the parameter: “Management allocates sufficient fund for annual training and development of the internal audit staff members” is “2” which means more than half of the respondents do not agree with the paragraph. Interview results indicate that the internal audit department doesn't administer its own budget; it is under the procurement, finance, and property management for budget purpose and this powerlessness

to administer own budget harmfully affects performance of internal auditor.

Again, as can be seen from the table below, most respondents, (59%) indicate that number of internal auditors is not sufficient to cover all the activities of their respected offices or bureaus. Furthermore, the researcher came to know that in most of the offices, except in Bureau of Agriculture and Rural Development and Health Bureau; even the required number of auditors according to organizational structure is not fully staffed. This is severe in Rural Roads Authority where there are only “2” auditors out of “5”. It is also worth noting that significant number of auditors (53%) feel that their respected bureaus do not sufficiently utilize audit reports and management's response to the internal audit findings and recommendations is generally not adequate. This would have far reaching suggestions on the auditor's boldness to improving audit quality and their pledge to develop a profession as internal auditor.

As it is shown in table 4 below, the median for items “1”, “7” and “8” is 3. For item number 1, the total of respondents who replied “Agree” and “Strongly Disagree” constitute only 34%; (i.e. Strongly Agree = 6% and Agree = 28%) and the number of respondents who replied “Disagree” and “Strongly Disagree” constitute 19%. Majority of the responses are concentrated in the Neutral category indicating that respondents are reluctant to provide the real information. This may be due to fear of being punished by their bosses. What is most important is that comparing the number of respondents who replied *Strongly Agree + Agree* with the number of respondents who replied *Disagree + Strongly Disagree*. In items “7” and “8”, the percentage of respondents who replied [Disagree + Strongly Disagree] is greater than the percentage of respondents who replied



[Strongly Agree + Agree] and therefore managements of the organizations surveyed are required to think of the problems and take actions. In item number 1, though the percentage of respondents who replied Strongly Agree + Agree is greater than the percentage of respondents who replied Disagree + Strongly Disagree respondents, the greater percentage of abstainers indicates that there is something which respondents are dissatisfied with.

In this study, responses to most management support parameters were either neutral or negative and in all the parameters, except for item 6, the **Strongly Agree** and **Agree** responses constitute below 50%. From this, it can be concluded that *less management support is found as the major challenge for internal auditors in executing their duties.*

**Questionnaire responses – Management Support**

Items	SA(5)	A(4)	N(3)	D(2)	SD(1)	M
1. Top management provides the necessary support to internal audit department.	2(6%)	9(28%)	15(47%)	6(19%)	0	3
2. Management allocates sufficient fund for annual training and development of the internal audit.	0	4(13%)	10(31%)	15(47%)	3☆9%	2
3. Internal audit dept. has sufficient number of staff.	3(9%)	3(9%)	7(22%)	8(25%)	11(35%)	2
4. Salaries are sufficient to attract and retain auditors with the required professional skills.	0	3(9%)	11(34%)	13(41%)	5(16%)	2
5. Quality assurance & improvement programs exist	0	6(19%)	7(22%)	15(47%)	4(12%)	2
6. There is complete internal audit manual to guide internal auditors.	2(6%)	18(56%)	5(16%)	7(22%)	0	4
7. Auditees regard internal audit as a value adding service.	0	8(25%)	11(34%)	13(41%)	0	3
8. Top management demands implementation of internal audit recommendations	1(3%)	7(22%)	7(22%)	10(31%)	7(22%)	2

Source: Questionnaire results, 2018

**CONCLUSION**

Although the survey covered a relatively small geographic area and units, the variety of organizations included in this study provides a relatively illustrative picture of the internal audit units’ activities in the region in which the surveyed bureaus are found.

Based on the analysis of information made, the following *findings* are noted in almost all the bureaus.

- Despite the Ethiopian Internal Audit Manual limits internal auditors to abstain from judging specific operations for which they were previously accountable, real practices from the analysis found that internal auditors are forced by their bosses to participate in audits of activities of their own previous works.
- Use of CAATs in audit works is found null and nearly all of the auditors in the surveyed bureaus are found Computer illiterate. Existing computers are used only for plan and report writing purposes. With regard to competence issue, significant number of auditors hold auditing work experiences of

below two years and therefore it is hard to conclude that all auditors have the required competence level to achieve the desired effectiveness level.

- Most internal activities in the surveyed organizations are found to stick to the more traditional audit types with limited areas which is far behind the state of the art.
- Auditors feel that management does not provide annual trainings and development workshops for internal audit staff members. Of course, interview responses showed that the Version Inspection rarely arranges internal audit training.
- Number of internal auditors in most of the bureaus found insufficient. Only two of the total surveyed organizations had fully staffed internal audit sections.
- Internal Audit Department Heads have less knowledge to prepare quality assurance and improvement programs. Management also has



less knowledge and motive to arrange these programs.

## RECOMMENDATIONS

Results of this study revealed that the internal audit activities yet emphasize on the traditional financial and compliance audits with limited scope.

In response to the weakness summarized above, the following recommendations are forwarded.

☒ Internal Audit Units in all organizations have to maintain the *attribute standards* of *Independence* and *Objectivity*. More specifically, participation of internal auditors in audits of operations under their authorizations, (which has an adverse effect on their objectivity), has to be avoided.

☒ To cope with the ever changing technology advancement and complex business environment, internal auditors are required to be acquainted with the basic computer skill and acquire the relevant technological literacy to do their jobs. Therefore concerned bodies are recommended to arrange basic computer trainings for their auditors.

☒ The scope of internal audit work be extended to include corporate governance and risk management roles in addition to the traditional financial and regularity audits; i.e the IAUs of the organizations are required to widen their audit scopes than to stick to the routine and non-value - adding activities.

☒ Managements should allocate sufficient fund and arrange annual trainings for the development of the auditing profession and auditors have to beware to continue their education and participate in different professional associations to reach the highest level in the profession.

## FUTURE AREAS OF INVESTIGATION

A nationwide similar study is encouraged to get the overall picture of internal audit section in Ethiopia. A research to identify the determinants of effectiveness of internal audit in private sectors is also recommended.

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# ISOLATION OF PATHOGENIC FUNGI IN MELON AND WATERMELON CROPS AND IDENTIFICATION OF THEIR PATHOGENIC PROPERTIES

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## ABSTRACT

*This article presents the results of our research in the Kashkadarya region, the isolation of pathogenic fungi in melon and watermelon crops and their pathogenic properties.*

**KEYWORDS:** *melon, watermelon, disease, fungus, pathogenicity, strain, downy mildew, mildew, alternarium, cladosporium, fusarium, verticillium, wilting, rot, rhizoctonium.*

## INTRODUCTION

Melons belonging to the group of melons *Cucumis melo* L. and watermelon - *Citrullus lanatus* (Thunb.) Matsum. et Nakai, whose plants like agricultural crops, have been cultivated in all countries since ancient times. Because they are rich in nutrients that are very important for the human body. That is why they have been loved and consumed by the entire population of our planet and are still consumed today. Melon has a wonderful taste and unique properties. It contains 85.0-92.0% - water, 8.0-15.0% dry matter, 0.8% protein, 1.8% fiber and 6.2% other carbohydrates, 20.0 - 30 mg% of the drug, 0.03-0.7 mg% of other drugs and trace elements such as Zn, Fe, Cu, Mg, K, P, organic and mineral salts [1; 3].

Fungal species with plant disease properties are common in many countries of the world. Because with the right conditions for their growth and development, they have the ability to grow and develop

in all environments. Their propagation occurs by wind in the air stream through the host plant seeds, diseased plant remains in soil conditions, and other means.

The entry of pathogenic fungal species into plant tissues is also different. They can enter mainly from the host-plant tissue organs, the root system, the places where various mechanical injuries that occur in the plant are cracked [5].

Biological injuries are caused by sudden changes in weather conditions, strong winds, hailstorms, or plant diseases caused by pests and disease-causing microorganisms. Infected leaves and other diseased organs dry out, shedding leaves become bare. This group of diseases is caused by species belonging to the genus *Fusarium*, *Botrytis*, *Alternaria*, *Aspergillus*, *Cladosporium* and others [4; 6].

**MATERIALS AND METHODS**

To study the pathogenicity of pathogenic fungal species in melons and watermelons, 10-14-volume samples were taken from leaves taken from their middle tier during the flowering period of plants and infected with *Alternaria*, *Cladosporium* and other genera. The prepared moist medium is placed on the filter paper in the chamber, then 1 drop of inoculum on the leaves - drip on the chamber Goryaeva (5 mm volume  $3 \times 10^3$  conidia / ml concentration). Then they are stored in thermostats (20–24OS) for 5–7 days.

To study the pathogenicity of mildew and downy mildew pathogens, we carried out by spraying the collected fungal spores on plants with a spray apparatus [2].

**RESULT AND DISCUSSIONS**

According to our research, 199 strains of 10 pathogenic fungal species were isolated from melon and watermelon crops, of which 100 were isolated from melon and 99 from watermelon diseases. Their morbidity rates for melons and watermelons were 51.2% and 41.8%, respectively.

The largest number of strains were isolated from the species of fungi that cause fusarium wilt in melons - 26, followed by *alternarium* - 22, downy mildew - 20, a small number of strains - *verticillium* wilt - 11, mildew- 8, the rest 1 to 6 strains were recorded.

**Table 1.**  
Number of strains isolated from common diseases in melon and watermelon crops grown in Kashkadarya region of Uzbekistan and the incidence rate of the host plant,%. (2018-2020 y)

Names of diseased plants:		Names of diseases								The total number of strains and the degree of plant disease
		<i>downy mildew</i>	<i>mildew</i>	<i>Alternarium</i>	<i>Cladosporium</i>	<i>fusarium</i>	<i>verticillium</i>	<i>rhizoctonium.</i>	<i>Botrytis</i>	
<b>melon</b>	Number of isolated strains, pcs	8	20	22	6	26	11	2	7	100 pcs
	The degree of disease of the plant, %	4,3	10,0	11,0	3,0	13,1	5,6	1,0	3,6	51,2%
<b>watermelon</b>	Number of isolated strains, pcs	7	19	22	6	28	9	1	8	99 pcs
	The degree of disease of the plant, %	2,9	8,0	9,0	2,5	11,9	3,7	0,6	3,8	41,8%



In the separation of fungal species into pure cultures, it is important to select the most active strains from them. This is because if the plant has been artificially infected, it is only when the diagnostic description of the disease is shown that it is certain that the species that caused the disease is the cause.

During the research, herbarium samples were collected from infected members of melon and watermelon crops grown in Kashkadarya region of Uzbekistan, and 3 classes, 6 orders, 8 families, 15 genera, 26 species and 7 species of fungi were identified. Most species are representatives of the Deuteromycota department 21 species 6 forms; then Oomycota - 3 rounds; Ascomycota - 2 species, Mycelia steria - 1 species. The most common pathogens belong to the family Fusarium, 5 species 6 forms; 3 species were identified from the Alternaria family, 2 species from the Erysiphe family, and 1-2 species from the remaining family; Of the identified species, 22 species and 7 forms were separated from melons, 19 species and 2 forms from watermelon.

*Alternaria alternata* from the melon plant. *Aspergillus clavatus*. *Erysiphe cichoracearum*. *f.cucurbitacearum*, *Fusarium gibbosum*, *f.sp.melonis*, *Fusarium moniliforme f.sp.melonis*, *Fusarium oxysporum*, *Fusarium oxysporum f.sp.melonis*, *Fusarium semitectum f.sp.melonis*, *Fusarium solani f.sp.melonans*, *Penicillin*, *Pythium sp.*, *Rhizoctonia solani*, *Verticillium nigrens* lar;

*Alternaria cucumis*, *Cladosporium herbarum*, *Erysiphe sichoriaciarum*, *Fusarium oxysporum f.sp.niveum*, *Trichothecium roseum* and others were identified from the watermelon plant.

When determining the degree of morbidity of melon and watermelon crops of fungal species that are common and cause a lot of damage to horticulture, it was found that the strongest disease is caused by fusarium wilt. Then there is fusariosis root rot, alternariosis staining and flour-dew. The least common disease is ascocytosis, a disease that occurs only in watermelons.

## CONCLUSIONS

The main biological feature of the pathogenic fungal species is the study of their distribution patterns, their ability to continue to grow and develop, located on top of the host plant tissue. As a result of our observations and experiments, it became clear that conidia or spores of fungal species that caused the disease were used to infect the plant from injuries caused by mechanical or biological processes at the top of its tissues.

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# FACTORS AFFECTING LOCAL FARMERS ADOPTION OF EUCALYPTUS WOODLOT IN JAMMA DISTRICT, SOUTH WOLLO ZONE, AMHARA REGIONAL STATE OF ETHIOPIA

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## ABSTRACT

*Eucalyptus is one of the most widely planted exotic tree species grown in Ethiopia. The species have been planted as a woodlot by local farmers and became one of the most economically important tree plants. The main objective of the study was to identify factors that determine the local farmers' decision making of eucalyptus woodlot production in Jamma District, Ethiopia. The survey was carried out on 150 local farmers who were selected through systematic random sampling. The collected raw data were analyzed through descriptive statistics and binary logistic regression analysis. The result of the study shows that landholding size, Farmers' education level; the age of the farmers were positive significantly affecting the adoption of eucalyptus woodlot. On the other hand fertility of land, family size and distance from the market was affecting the farmer's adoption of Eucalyptus woodlot production negatively. To protect the forest from deforestation and increase the income of households, it recommends that policymakers should work with stakeholders to create an enabling policy environment to support Eucalyptus production in Ethiopia.*

**KEYWORDS:** *Adoption, Eucalyptus Tree, Farmers, Plantation, Woodlot, Ethiopia.*

## 1. INTRODUCTION

Eucalyptus plantation is mainly started in Ethiopia in 1895, to satisfy the increasing demand for construction poles and firewood in the capital city of Ethiopia, Addis Ababa (Yetebitu Moges, 2010). Eucalyptus plantations playing an important role as the major source of fuelwood, construction materials, and provide income for both urban and rural dwellers (Zerfu, 2002). In Ethiopia, where there are huge gaps between demand and supply of wood which lead to exploitations of natural resources and caused deforestation in past twenty years. Using fast-growing species to produce a huge quantity of wood like eucalyptus was extensively increasing nationwide since 1895. Eucalyptus is the most commonly grown tree species in most parts of Ethiopia as a community and household woodlots (Duguma et al, 2009). This tree species grows well even on infertile soils and grows faster compared to most indigenous

tree species like *Cordia Africana*, *Juniperus procera*, and *Hagenia abyssinica*. Eucalyptus is a popular tree crop due to its fast growth and easy establishment properties. Local farmers used it to meet their demand for different products and services, and they have gained a strong local knowledge of the various Eucalyptus species management (Gessese Dessie, 2011). Eucalyptus woodlots have the power of changing farmers' livelihoods to a better lifestyle. Planting eucalyptus is more preferable than other tree species in most parts of the country. It is an important source of industrial input, farm tools, transmission poles, and guarantees for food security at the time of hardship for smallholder farmers in the rural area. Moreover, it creates job opportunities directly and indirectly for others. In the study area, local farmers have been using white eucalyptus (*Eucalyptus globules*) woodlot as an important cash income source and are going to replace their land from food



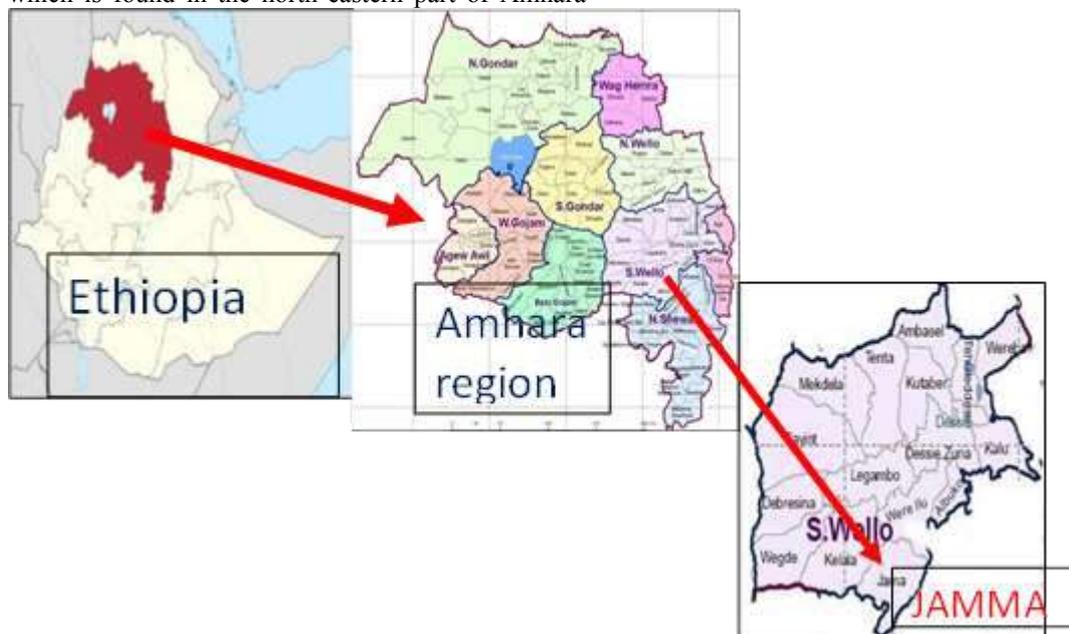
crops to eucalyptus production. On the other hand, many other local farmers who did not participate in eucalyptus woodlot production were observed. In this area, the study was not carried out to identify the reason why some farmers are not engaged in eucalyptus woodlot production to use as an income source. Therefore, this study was conducted to investigate the factors that determine local farmers' adoption of eucalyptus woodlot production with an attempt to fill the existing knowledge gap.

National Regional State, South Wollo Zone, Ethiopia. The geographical location of the district lies between 10°23'0" and 10°27'0"N latitude and between 39°07'0" and 39°24'0"E longitude. It has an altitude ranges from 1600 to 2776 m above sea level. It is bordered by Legahida, Mida, Gera Mider, and Kelala from the north, south, east, and west respectively. On the southeast, it is also bordered by the Qechene River which separates it from North Shewa Zone. Its capital town is called "Degolo", which is about 260 km away from Addis Ababa and 110 km far from the zonal city of South Wollo Zone, Dessie.

**2. RESEARCH METHODOLOGY**

**2.1. Description of the study area**

The study was conducted in Jamma district, which is found in the north-eastern part of Amhara



**Figure 1: Study Area Location**

**2.2. Methods of Data Collection**

The data was collected from jamma district of north-eastern Amhara, Ethiopia, where eucalyptus woodlot has been widely expanded. Prior to the actual survey, author visited jamma district to gather the secondary information relevant to the study. A formal data collection were carried out by using a structured questionnaire aimed for capturing both quantitative and qualitative information's, following the methods of (Endalew, 2016), (2010) and (Matiku, 2012). The questionnaires were administered using a personal interview approach, which is recommended to avoid non-responsive bias (Harrison S., 2002). Therefore, the questionnaires written in English were translated into 'Amharic' of the local language in which the interview will be conducted to control the quality of data and minimize errors.

**2.2.1 Sampling Procedure**

Sampling allows us to gather information from a smaller, more manageable subset of the population. That information can be used to constitute the greater population. There are altogether 240 households in the target villages. The sample size was calculated at 5% precision level by using the formula developed by Taro Yamane (Yamane, 1967).

$$n = \frac{N}{1+Ne^2}$$

Where; n = sample size N= total population of household e = precision level

Thus, the result of the sample size calculation 240/(1+240\*(0.05)<sup>2</sup>) was 150. Then, it was equally allocated to each target of the three villages. Preliminary data on qualitative and quantitative were directly collected from the local farmers in the Jamma District to where the intended of three villages (namely Gomenty, Yejerety, and Micha)



where eucalyptus woodlot production widely experienced. One hundred fifty (150) eucalyptus woodlot owner farmers were randomly selected and interviewed using the questionnaire.

### 2.3. Methods of Data Analysis

Binary logistic regression analysis was used to address the main objective of this study. After the completion of data collection, data were coded and entered into Stata version 13 computer programs for analysis. The goal of this study was identifying the factors that determine local farmers' adoption of eucalyptus woodlot production. It was used to analyze the determinants of the local farmers' adoption in Eucalyptus woodlot production and the

data were described to explain the relationship between the dependent binary variables and independent variables. In the logistic regression, the dependent variable was a binary response were Eucalyptus woodlot adopter labeled as 1 and 0 otherwise. Independent variables like; age, sex (female and male), educational level, distance from the market, family size, Fertility of land, and landholding size were used for data analysis. The logistic model ensures that the estimated response probabilities were strictly between zero and one. The definition of the variables included in the logistic regression model was stated in (Table 2.1).  $P(y = 1|x) = G(\beta_0 + \beta_1Ag + \beta_2Gd + \beta_3Fs + \beta_4El + \beta_5Ds + \beta_6Lhs + \beta_7FL)$ .

**Table 1.1 : Description of Logistic Variables and Their Expected Sign**

Variables Description	Abbr.	Unit	Measurements	Expected Sign
EWLP Adoption	<b>EWLA</b>	EWL adopters	1, 0 otherwise	Dependent variables
Age	Ag	Year	Continuous	-
Gender	Gd	Male	1, 0 otherwise	+
Family size	Fs	Numeral	Continuous	+
Educational level	El	Numeral	Continuous	+
Distance	Ds	Km	Continuous	-
Landholding size	Lhs	Ha	Continuous	+
Fertility of land	FL	Fertile	1, 0 infertile	+

Where;

$\beta_0$  – Intercept

$\beta_1 \dots \beta_7$  – the parameter which measures the change in EWL Adoption concerning Ag ... Lhs, holding other factors fixed

P = Probability

G = Logistic functions ( Gujarati, 2007)3. Results and discussion

### 3.1. Demographic and Socioeconomic Characteristics of Sampled Farmers

Descriptive statistics were performed to analyze the socio-economic characteristics of the sampled farmers. The variables used for this section are age, gender, educational status, family size. Therefore, the data output of descriptive statistics of general sampled households' information was

presented in table 3.1. The result shows that the majority of the sampled farmers were men (82.67%) and 17.33% are women. This is indicated that male farmers are more adopted eucalyptus production than females in the study area. The educational level of the household was categorized into four groups. Namely, elementary whose educational level is below nine years of education, a secondary school whose educational level is nine up to twelve years of education according to the educational curriculum of Ethiopia. According to survey results, 28.67% of the respondents were illiterate, 55.33% were attended elementary school and 16.00% were attended secondary school (table 3.1). The educational level of households has been one of the main factors in the adoption of EWL.

**Table 3.1 General information on the socio-economic characteristic of sampled farmers**

		Adopter(N=100)		Nonadopter (N=50)		Cumulative Percent
		Freq.	Perc.	Freq.	perc.	
Educational Status	Elementary	55	55	28	56	83
	Illiterate	30	33.33	13	3.8	28.67
	Secondary School	14	7.1	10	5	16.00
Gender	Female	16	6.25	10	5	17.33
	Male	100	1.00	24	48	82
Age	30-50	53	53	40	12	62.00
	51 - 60	30	33	20	4	33.33
	> 61	5	20	2	25	4.67
Family Size	5 - 8	40	25	17		38.00
	9 - 13	20		19		26.00
	1 - 4	32		22		36.00

The age structure of the households is classified into three groups (30- 50years), (51-61 years), and over 61 years old, about 62.00%, 33.33%, and 4.67% of sampled households were interviewed respectively. These surveys consist of different age categories; participation from people of different ages provides reliability for analysis. More precisely, according to (Ho, et al, 2012) middle-aged(30-50) categories can be considered as more informative and conscious groups in society, who can focus on the country's social and political activities and better assess society's choice. The total family size of the interviewed households was ranged between 1 and 13 members. Among the local farmers households 38% of them have between 5 and 8 family size. While the smallest was 26.00% with 9 and 13 family sizes.

### 3.2. Factors affecting local farmers' adoption of eucalyptus woodlot production

The logistic regression model was employed to analyze factors affecting local farmers' adoption of eucalyptus woodlot production. In the model used, "adopter" means that, a local farmer who produces eucalyptus woodlot and otherwise considered as "non-adopter". Accordingly, the results in (Table 3.1) were shows that five variables were affecting the adoption of eucalyptus woodlot by local farmers and found to be statistically significant. Hence, Landholding size, education, and Family size affect positively on the other hand distance from the market and fertility of land affect negatively, whereas the

rest dependent variables were found to have not affecting the adoption of eucalyptus woodlot production significantly. The significant dependent variables that affect eucalyptus woodlot production in the study area were discussed as follows:

#### 3.2.1. Family size

It was found that the family size of the farmers has positively related to the adoption of eucalyptus woodlot by local farmers and it affected significantly, at less than 10% significant level. The coefficient of (1.319) for family size indicates that keeping the influence of all other factors fixed, as the family size increases by one, the local farmers' decision to adopt eucalyptus woodlot production will increase by 1.319 in the study area. The result shows that farmers who have large family sizes are not devoted to adopt eucalyptus woodlot production than farmers with small family sizes. This is due to availability of sufficient household labor force in large families to engage in intensive crop production activities (Summers, et al, 2004) and (Nsiah, 2010) However, the study by (Dereje et al, 2012) indicates that the total family size had no significant effect on farmers' decision to plant eucalyptus.

#### 3.2.2. Landholding size

The result shows that farmer's land size had affected positively and significantly, the probability of local farmers adopting eucalyptus woodlot was less than 5% significant level. The coefficient of 0.442 for landholding size indicates that keeping the



influence of all other factors fixed, the adoption of eucalyptus woodlot by local farmers will increase by a factor of 0.442 as land size increases by one hectare. Hence, adoptions of eucalyptus woodlot production by local farmers were connected positively and significantly with land holding size. As shows in the result that farmers who have large land sizes are more devoted to adopt eucalyptus woodlot than the farmers who have small land size in the study area (Shifa, et al 2015). Land size is a very important resource to practice in eucalyptus woodlot production, because farmers divide their land for different activities, such as growing different crops, rearing diverse animals, and thereby likely to generate sufficient income, which could help them to produce or/and buy required food and non-potential factor in household tree planting and positively correlated with households' decision to plant and allocates land for eucalyptus woodlot.

### 3.2.3. Fertility of farmers' land

As shows in the result the probability of local farmer's adoption of eucalyptus woodlot production is negatively connected to the fertility of the land and significant at less than 1% significant level. The coefficient 1.945 for the fertility of land owned by the local farmers implies that local farmers who have unsuitable land for crop production are 1.945 times more likely to adopt eucalyptus woodlot compared to local farmers with fertile land which is suitable for crop production. The result indicates that the local farmers are more committed to plant eucalyptus woodlot when the fertility of their land decline. In the study area, the farmers who have fertile lands are focused on crop production to produce enough amounts of food crops in order to enable of feeding

their families. Whereas, the medium fertile or infertile land is not suitable for crop production, hence they were changing their land to eucalyptus woodlot production. (Nsiah, 2010) also pointed out in his report that farmers use their infertile land for plantation purpose while productive lands were reserved for agricultural crop production. Similarly, (Kebede Gizachew, 2017) indicated that the farmlands should be changed to eucalyptus woodlot production to improve the productivity of the land, when the land is not productive since the farmers cannot produce agricultural products.

### 3.2.4. Distance from the market

The result shows that the location of farm land from the market were farmers can sell their products were related positively and significantly with the adoption of eucalyptus woodlot by smallholder farmers at less than 1% significance level. It indicates that the farmers who had landed near to the market and access to the market for the inputs and outputs of eucalyptus woodlot production were 2.035 times more likely to adopt eucalyptus woodlot than the local farmers who were far from the market and faced difficulty to ship their products to the market. The Woodlot producer farmers who have the farm land not far from the market can access the required materials easily for eucalyptus woodlot production and they could sell their products at right time efficiently, which affects the decision of local farmers to adopt eucalyptus woodlots on their land positively that help them to lives better lifestyle. The result related to (Nsiah, 2010) finding who pointed out the availability of a market near to the farm local farmers' decision to use the land to trees production increases.

**Table 3.1: Logistic regression model output showing the Factors of local farmers' adoption of EWL**

Adoption of EWL	Coef.	St.Err.	t-value	p-value
Ag	-.052	.022	-2.32	0.02*
Sex	-.313	.446	-0.70	0.484
Distance (km)	-2.035	.052	-2.81	0.005**
Family size	-0.35	1.319	-0.55	0.000**
Educational status	.889	.515	1.73	0.084*
LH size	.442	.311	1.42	0.155
Fertility of land	-1.945	0.65	-0.54	0.001*
Constant	5.856	2.48	2.36	0.008**

Number of obs	150.000
Prob > chi2	0.000
Pseudo r-squared	0.240
Chi-square	47.777



\*\*\*  $p < .01$ , \*  $p < .1$

\*\* = highly significant at 0.01 confidence level, \* = significant at 0.1 confident level, EEI = environmental and economic impact, EWL = Eucalyptus woodlot

#### 4. CONCLUSION AND RECOMMENDATION

Local farmer's adoption of eucalyptus plantation in the form of woodlot goes to increasing. Furthermore, some farmers were using their fertile lands to tree production. The result indicated that landholding size, age of the farmers, and farmer's education level was positively and significantly affected the adoption of eucalyptus woodlot by local farmers. On the other hand, woodlot production adoption is negatively affected by family size and fertility of the land (based on farmer's perception) of the farmers. Therefore, the socio-economic characteristics of the farmers were the main factors that can motivate or decline the adoption of eucalyptus woodlots by local farmers. Hence, to optimize the positive value of eucalyptus, and reduce its negative effects the concerned institution should give attention for changing the farmer's attitude, contribute to the enhancement of farmer's income. Government agencies need to work together with research institutions and the local community to set up and implement policies to support eucalyptus woodlot be managed sustainably and provide maximum economic, social, and environmental benefit for the local community in Ethiopia.

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## IMPROVING THE SECURITY REGULATORY FRAMEWORK

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### ANNOTATION

*Improving the legal framework for the activities of modern security safety units in Uzbekistan.*

**KEY WORDS:** *Security service, protection of property rights, principles of protection, a concept unique technical policy.*

### «Совершенствование нормативно-правовой базы в области охраны»

**Аннотация.** Современные требования к улучшению нормативно-правовой базы для функционирующих подразделений охраны в Узбекистане.

**Ключевые слова:** Службы охраны, безопасность, защита прав собственности, принципы защиты, концепции едино технической политики.

### «Қўриқлаш таъминлашга оид бўлган норматив –ҳуқуқий ҳужжатларни базасини такомиллаштириш»

**Аннотация.** Ўзбекистонда замонавий қўриқлаш таъминловчи бўлинмалар фаолиятини ҳуқуқий асосларни такомиллаштириш.

**Таянч тушунчалар:** Қўриқлаш хизмати, хавфсизлик, мулк ҳуқуқлар ҳимояси, қўриқлаш принциплари, ягона техник сиёсат концепцияси.

Uzbekistan has chosen the path of developing democratic institutions operating in the state and society today and strengthening its socio-political position. First of all, it will be the main foundation for the future development of the country<sup>1</sup>. The economic and social basis of the

country as a basis for building society is private property and forms of economic property.

Therefore, in Uzbekistan, as many countries, the forms of property and its material and

[<sup>1</sup>] President of the Republic of Uzbekistan "On the Republic of Uzbekistan in 2017-2021 State program for the implementation of the action

strategy in five priority areas of development in the "Year of Active Entrepreneurship, Support of Innovative Ideas and Technologies" Decree No. PF-5308 of January 22, 2018.



spiritual resources , as well as private property, which serve the development of the state , are inviolable and protected by the state<sup>2</sup>.

The state must constantly develop its economy, strive to improve the economic and social life of its citizens, ensure the security and protection of their natural and spiritual wealth.

A number of changes are being made in the field of security, as well as reforms in all parts of the country as well as one of the main tasks is to form and improve the activities of sectorial services. That's for sure, some special requirements will be made in the field of the National Guard.

Today The National Guard units are effectively entrusted with the protection of the most important, classified and other objects of the state , the property of individuals and legal entities<sup>3</sup>.

To this end, paragraph 8 of the decree of the President dated March 6, 2019 No -4229 provides for the organization of security services in accordance with modern requirements<sup>4</sup>. The decision of the Organizing the activities of the security service of the National Guard of the Republic of Uzbekistan was made under this decree.

In order to improve the technical and security services, which is one of the main links of the security service in accordance with the requirements of the service , a normative bleaching act was adopted to improve the activities of the technical security service monitoring centers of the National Guard.

In accordance with this decision, the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated July 5, 2019 No 555 "On the organization of security services of the National Guard of the Republic of Uzbekistan" was adopted. The normative-legal document on the organization of activity of monitoring centers (points) of technical security service of National Guard security units is accepted<sup>5</sup>.

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[<sup>2</sup>] Article 53 of the Constitution of the Republic of Uzbekistan.

[<sup>3</sup>] Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated July 5, 2019 No 555 "On the organization of the security service of the National Guard of the Republic of Uzbekistan."

[<sup>4</sup>] Paragraph 8 of the Resolution of the President of the Republic of Uzbekistan dated March 6, 2019 No PP-4229.

[<sup>5</sup>] Instruction approved by the Order of the Commander of the National Guard of the Republic of Uzbekistan dated September 30, 2019 No. 197.

This normative – legal document security service of the National Guard of the Republic of Uzbekistan, determinism *first of all* , the monitoring center and technical security engineering procedure for registration of inspections of facilities;

*second of all* , the territorial location in the description of the object , the technical strength of the road , the legal documents of the organization that installed and carried out the installation of security and fire alarm system tools;

*third of all* , the basics of the connection of the installed security and fire alarm system vehicles to the city units and the city communication network;

*fourth of all* , to strengthen the technical robustness of the facility by the specialists of the security service and order of the Monitoring center or technical security engineering engineers to connect the city telephone number of the facility to the security devices installed in the regional automatic telephone exchange.;

*Fifth of all* , technically inspected main , classified facilities , banking institutions and their branches , storage facilities for precious metals , psychotropic and narcotic facilities , warehouses for weapons , white drugs and explosives , museums, procedures for the inspection and control of technical engineering soundness of the enterprise cash registers in the established terms;

*sixth of all* , the requirements of special traffic privileges in the rules of the road when driving on guarded objects on the message of "concern " ;

*sevens of all* , methods of the theoretical and practical training with the personnel of mobile teams, procedures for theoretical and practical training of staff on the possible evacuation of criminals from the scene and other emergency procedures ;

*eights of all* , the types of service documents and their maintenance in the center of control and monitoring of security equipment and regional centers of technical protection ( points)<sup>6</sup> .

This, in turn , protects the property of the state , the main and classified objects , individuals and legal entities on a control basis , control and coordination of compliance with the internal permit procedure at the protected , quality and modern information and communication in the field of security of protected objects , the introduction of weight loss techniques and the implementation

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[<sup>6</sup>] Instruction approved by the Order of the Commander of the National Guard of the Republic of Uzbekistan dated September 30, 2019 No. 197.



of a single technical policy in the field of service<sup>7</sup>.

It should be noted that the introduction of this single system of maintenance began five years ago in our country. In cooperation with the "Socrates" (Organizational Society for Protection) which is located in Russian Federation in the city of Irkutsk Protection Bureau, a new type of fire alarm system [Pritok - A], which can be connected to a modern information and communication system, is being fully implemented in some cities of the country<sup>8</sup>.

Since 2013 year by the General directorate of security of the National Guard of the Republic of Uzbekistan.

Today, Single Protection units are being implemented in Yunusabad, M.Ulugbek, Shayhantahur, Yashnabad, Chilanzar, Mirabad and Yakkasaray districts of Tashkent a total of 4842 objects, 8372 houses are being protected by, technical protection centers guard<sup>9</sup>.

It should be noted that today, despite the measures taken by the security services, areas that can be technically serviced, such as accommodation

The level of equipment of private housing, apartment buildings, hospitals, dormitories, hotels, educational institutions, preschools, residential and social services and other facilities with fire alarm and video surveillance systems remain as deficient.

What does this indicate? It can be noted, through the Center for Control and Monitoring of Protection equipment of the Security Service and the regional technical protection centers in the above – mentioned current legislation, the conditions of protection of the facility and the homes of citizens and the management and control of the activities of mobile teams<sup>10</sup>.

However, in our opinion, The Decree of the Cabinet of Ministers, adopted on July 5, 2019, regulates the activities of the National Guard.

***But it would be expedient to adopt a legal document that would encourage its activities and regulate the mechanism of effective work of the***

[<sup>7</sup>] Item 1 of the Resolution of the Cabinet of Ministers of the Republic of Uzbekistan dated July 5, 2019 No 555 "On the organization of the security service of the National Guard of the Republic of Uzbekistan".

[<sup>8</sup>] Specialized informational-analytical journal on the problems of safety 2018 (08).

Tashkent city ENT reporting documents (2019).

[<sup>9</sup>] Tashkent city ENT reporting documents (2019).

[<sup>10</sup>] Instruction approved by the order of the Commander of the National Guard of the Republic of Uzbekistan dated September 30, 2019 No. 197.

**security service.** This includes, in turn, the control over the theft of the state facilities, important, classified and other facilities, the property of individuals and legal entities, as well as the commission of theft at these facilities and it would be the basis for ensuring public safety and victim prevention of crime.

As a proposal, a separate chapter of this legislation should be introduced as follows:

- Protection of the rights and interests of citizens, taking practical measures for their social protection;

- Representation by the Service for the development and Enforcement of legal Mechanisms for Prosecution in Cases of Violation of the Rights and Freedoms of Citizens;

- Introduction of algorithms and programs for digital processing of video data and creation of normative bases, particular attention should be paid to the requirements for the manufacturer of video surveillance equipment to be installed in cities.

They are: hardware warning software for video signal loss,

- A program owning a signal that the surveillance in the camera has changed or stopped working.

- To develop conditions for long term storage and processing of data. One of the problems that need to be addressed in these modern cities is the determination of their capacity to prevent the shut down of the main surveillance video surveillance center or the burning of data

As a conclusion, it can be said the development of security services in the future will protect the personal property of the object, regardless of the form of ownership on a contractual basis, which will increase the *tariffs for existing quality services*, which will lead to an increase in new types of organizational maintenance, responsibility for security and guarding, *prevention of crimes in the protected area*, and the identification of offenders.

Therefore, as a measure of victim's prevention of administrative and criminal offences that may be commuted in society through the National Guard.

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*protection of property of individuals and legal entities."*

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# DECODING TECHNIQUE FOR LOW POWER DESIGN IN XILINX

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## ABSTRACT

*This research paper is a survey of the current status of research and practice in various disciplines of low power VLSI developments. The paper briefly discusses the rationale of the contemporary, and concentrates on low power design, it presents the metrics and techniques that are used to access the merits of the assorted proposed for the improved energy efficiency. Power dissipation [1], [5] has become an important consideration in terms of performance and scope for VLSI chip design. The research paper describes the decoding strategies, methodology, and techniques for low power system design. Here also we have proposed the decoding technique and compared with silent coding to scale back the transition state and conserved the power which is additionally described during this research.*

**KEYWORDS**—Power minimization, decoding technique, silent coding.

## I. INTRODUCTION

More and more sophisticated signal processing systems are being introduced with a VLSI chip as the degree of integration continues to expand; these signal processing applications require not only high computing capabilities but also considerable energy consumption. The efficiency and field remain two key design objectives, electricity consumption in today's VLSI device design has become an important issue. Two main constraints are required for low power VLSI systems [2], [3]. Firstly, with the continuous increase in operating frequency and chip processing power, a big current is needed and thus the heat must be eliminated by proper cooling techniques because of its high energy consumption. Secondly, battery life is limited in handheld electronic devices; low power architecture ensures that these lightweight devices have an increased running period. Diwakar Tiwary [4] gave some ideas about different power management techniques which has opened up a new gateway in the field to meet futuristic challenges.

However, the critical guiding force is that lack of adequate power to detect statistically significant change is becoming a major issue incorporating more transistors on a single chip or a module for multi-chip. Preliminary results have shown the feasibility of energy consumption that would significantly reduce the heat resulting from VLSI circuit packaging, which includes output processes and programs. After a few dormant years recently there has been a rapid turnover of designing a power reduction technique [6] for high-performance criteria. These strategies were able to yield

a reduction in the severity of low power architecture, such as the clock gating for complex power reduction or several (multi- $V_t$ ) levels to minimize leakage current are the existing technologies [7] which are already well-established and funded.

The main aim of this research is to reduce the no of transitions state. As we decrease the transitions, we can conserve the power in a much more efficient way. In this paper, we have decreased the number of transitions more than the decoding technique. The rest of the paper is organized as follows: The low power decoding methodology are presented in Section III, the proposed architecture of the system in Section IV and experimental results in Section V. Finally, the conclusion and future works are discussed in Section VI.

## II. LITERATURE SURVEY

There are different encoding techniques for low power design to scale back the transition, which means to cut back the switching activity so that we can conserve the power. Several techniques are accustomed which implements sequential data and a few are used for parallel data. Some of the examples of coding techniques are differential coding techniques, sparse encoding, and limited-weight codes (LWC) are summarized below.

### A. Differential Coding

Differential coding [8] comes under the algebraic coding category which transmits XOR bit in between two



consecutive values. In certain scenarios, its bus value shows a strong connection between them and due to this striking feature, the hamming distance (HD) between two successive values is either large or small. For example, most of the least significant bits (LSB) are identical, triggering a small HD for two succeeding values. On a similar scale, most significant bits (MSB) show a contrasting feature because of sign extension, which results in large HD. In both the situation, the use of differential coding reduces bit transition state, as a result, almost all the bits within codeword (CW) become 0, and if delayed it becomes 1

### B. Sparse Encoding and limited-weight codes(LWC)

The Sparse Encoding technique offers an encoding scheme to reduce the number of 1s. A K-LWC is a sparse code illustration that corresponds to a community of CWs weighing up to K [9]. Note that in this term, the weight of a CW is the 1s number. We refer the reader to previous works [10], [11] for a statistical foundation of LWC. LWCs are constrained by the high logical complexity of their encoder and decoder and are not ideal for communication on the chip.

The above coding does not use any redundancy or metadata in either space or time. Space redundancy describes the use of additional bus lines and time redundancy demonstrates the use of extra transfer cycles.

## III. METHODOLOGY

We proposed a decoding technique which helps to reduce the transition. Our decoding technique is applicable in sequential data. It helps to consume power as well as save battery life. We implemented this Technique in 'Xilinx'. It briefly explains below.

### A. Proposed Decoding Technique

- Case 1: If  $L_1$  gets 1 then it will check from  $a_0$  to  $a_4$ . When it will get different bit after two same bit then swapping occurs in that position.
- Case 2: If  $L_2$  gets 1 then it will check from  $a_3$  to  $a_7$ . When it will get different bit after two same bit then swapping occurs in that position.
- Case 3: When  $L_1 = L_2 = 0$  then the result will get after decoding will be same as encoding.
- Case 4: When  $L_1 = L_2 = 1$  then checking occurs from  $a_0$  to  $a_7$ . We summarized it in Table II, as shown below.

TABLE II

Encoding	$L_1$	$L_2$	Decoding
11000110	1	1	10101010
00110001	1	0	01010001
10000110	0	1	10001010
11111111	0	0	11111111

Fig 2. Example of decoding output

### B. Proposed Technique Implementation in Xilinx

Xilinx is a synthesis tool that changes over Schematic/HDL design entry into practically proportional

rationale logic gates on Xilinx FPGA, with streamlined speed and region. It has some unique features i.e., it has mixed mode HDL design entry, Xilinx ISE permits mix with different synthesis engine from mentor graphics/exemplar, synopsis, and simplicity (XST is restrictive Synthesis Tool of Xilinx.). We have selected Xilinx for speed, reliability, logic density and stability. We have also implemented the encoding, and decoding code in Xilinx. We have included decoding code for reducing the transition state and data redundancy in Xilinx.

### Decoding Code in Xilinx

entity decode is

Port (I: in STD\_LOGIC\_VECTOR (0 to 7);

o\_new: out STD\_LOGIC\_VECTOR (0 to 7);

l1: in STD\_LOGIC;

l2: in STD\_LOGIC);

end decode;

architecture Behavioural of decode is

begin

process(I)

variable j, k: integer := 0;

variable o: std\_logic\_vector (0 to 7);

begin

o := I;

if (l1 = '1' and l2 = '0') then

j := 0;

for k in 0 to 2 loop

if (j < 3) then

if (o(j) = o(j+1) and o(j+1) /= o(j+2)) then

o(j+1) := not o(j+1);

o(j+2) := not o(j+2);

--o(j) := o(j);

J := j+2;

end if;

j := j+1;

end if;

end loop;

elseif (l1 = '0' and l2 = '1') then

j := 3;

for k in 0 to 2 loop

if (j < 6) then

if (o(j) = o(j+1) and o(j+1) /= o(j+2)) then

o(j+1) := not o(j+1);

o(j+2) := not o(j+2);

j := j+2;

end if;

end loop;

elseif (l1 = '0' and l2 = '1') then

j := 0;

for k in 0 to 5 loop

if (j < 6) then

if (o(j) = o(j+1) and o(j+1) /= o(j+2)) then

o(j+1) := not o(j+1);

o(j+2) := not o(j+2);

j := j+2;

end if;

j := j+1;

end if;



```

end loop;
end if;
o_new<=o;
end process;
end Behavioural;

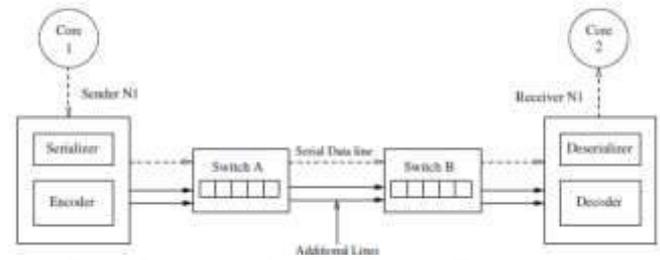
```

**Test Bench of Decoding**

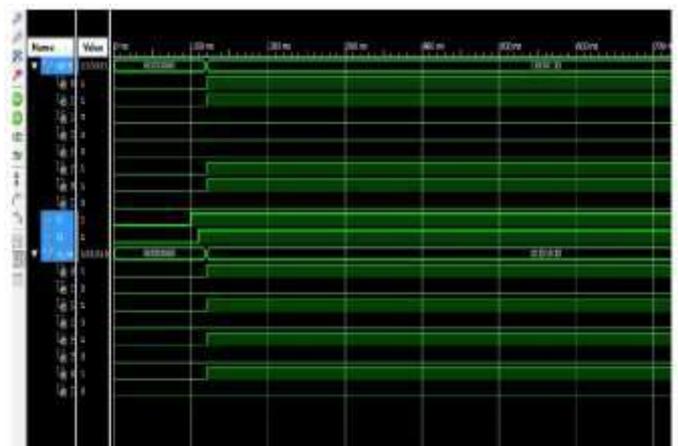
```

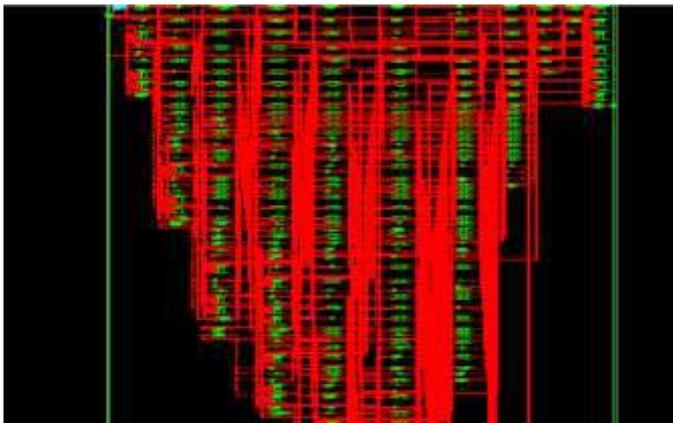
LIBRARY ieee;
USE ieee.std_logic_1164.ALL;
--Uncomment the following library declaration if using
--arithmatic functions with Signed or Undigned values
--USE ieee.numeric_std.ALL;
ENTITY testdecod IS
END testdecod;
ARCHITECTURE behavior of testdecod ID
---Component Declaration for the Unit Under Test (UUT)
COMPONENT decod
PORT (
I: IN std_logic_vector (0 to 7);
O_new: OUT std_logic_vector (0 to 7);
I1: IN std_logic;
I2: IN std_logic;
);
END COMPONENT;
--Inputs
signal I: std_logic_vector (0 downto 0): =(others=>'0');
signal I1: std_logic: = '0';
signal I2: std_logic: = '0';
--Outputs
signal O_new: std_logic_vector (0 downto 0);
--appropriate port name
--constant<clock>_period: time: = 10ns;
BEGIN
--Instantiate the Unit Under Test (UUT)
Uut: decod PORT MAP (
I=>I,
O_new=>O_new,
I1=>I1,
I2=>I2
);
--Stimulus process
stim_proc: process
begin
--hold reset state for 100ns.
wait for 100 ns;
I1<='1';
wait for 10 ns;
I2<='1';
I<="11000110";
Wait for 10 ns;
---insert stimulus here
--wait;
end process;
END;

```

**IV. PROPOSED ARCHITECTURE****Fig 3. Proposed Architecture of The System****V. EXPERIMENTAL RESULTS**

Preliminary functional experiments were performed to test the working functioning of CPU. Fig. 4 denotes the output of the decoding code followed by Fig.5 with RTL Schematic view which is simulated in the Xilinx ISE, and it is seen that when the reset signal is set to '1' value, it puts the CPU in the state of reset 1, which is the first condition of reset order. After the reset signal is fixed to '0', the CPU can have the ability to execute the reset\_sequence. From the above factors it is concluded that there are two most excellent signals to watch out for, such as current\_state and next\_state. It was interesting to note that, when the reset input was set to '1', the CPU remained in reset 1 condition and when the signal reset is fixed to '0', on the rising boundary of the signal clock, current\_state proceeds to reset 2 condition. At each signal clock rising edge which causes the CPU to proceed to the next step. A set of experiments were undertaken using different parameters each time until the source array is copied to the destination array. The simulator begins the simulation process. If the simulation is run ahead 100 nanoseconds, we observed that the CPU will start the reset sequence as the information is collected. This test is designed to verify the validity of functionality and the routed design. Note that, instead of one transition, the waveforms that are generated have number of transitions which are settled out. This transition encoding technique gives better results than other encoding techniques.

**Fig 4. Output of Decoding reducing transtion state**



**Fig 8. RTL Schematic View**

## VI. CONCLUSION & FUTURE WORKS

In our proposed decoding technique, the main motto is to attenuate the number of transitions within the serial circuit to cut back dynamic power consumption because of switching activity within the capacitances. The decoding structure has been implemented that always ends up in a significant reduction within switching activity. The framework is tested for various sorts of data streams while accounting for the info correlations. However, the addition of two extra lines causes a touch area and power overhead and it requires special attention.

Future work should focus on the minimization of transition state by correct techniques of the region, and the overhead efficiency. We are still seeking to use such a decoding strategy that reduces the area overhead due to encoder and decoder circuit.

## ACKNOWLEDGMENT

I want to acknowledge my deep sense of gratitude to my research guide Ms. Somrita Ghosh who directed and guided me with her timely advice and constant inspiration which eased the task of my research work.

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## **DIVIDING AN ARBITRARY OBTUSE ANGLE INTO THREE AND SIX EQUAL PARTS**

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### **ABSTRACT**

*The article deals with the division of an arbitrary obtuse angle into three and six equal parts. The authors of the article believe that knowledge of the methods used in geometric constructions allows drawing the outline of any product correctly, accurately execute the frame of the drawing format and mark the inscriptions. The techniques of geometric constructions are the basis for drawing, which greatly speeds up its implementation. The authors of the article suggested dividing an arbitrary obtuse angle into three and six equal parts which doesn't have any prototype.*

**KEY WORDS:** *draw, contour, part, geometric, line, radius, circular, segment, point, arc, circle, serif, intersection.*

### **DISCUSSION**

By geometric constructions are understood elementary planes based on the basic provisions of geometry. These include drawing perpendicular and parallel lines, division of segments, angles, etc. Knowledge of the techniques used in geometric constructions, allows to draw correctly any product, execute accurately the format frame drawing and mark inscriptions. Thus, the techniques of geometric constructions are the basis for drawing, which greatly accelerates its implementation, as it allows in each case to choose the most rational methods of

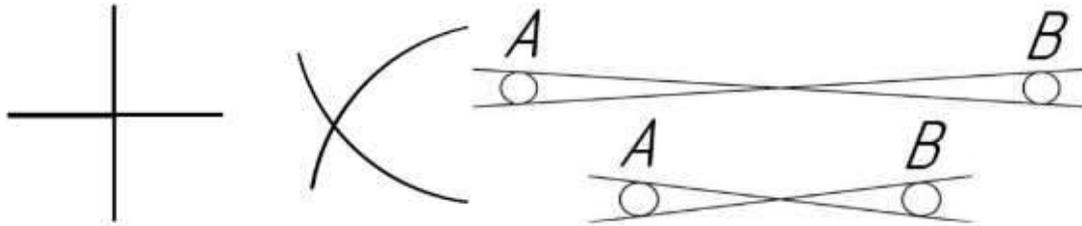
construction to master the correct methods of working with drawing tools [1].

Graphic constructions are always imprecise, but the degree of imprecision can be different. Construction is more exact if it contains few operations (an operation means drawing a straight line, drawing an arc of a circle, postponing a line segment, etc.). Therefore, when solving graphical problems, constructions with the least number of operations should be chosen.

The accuracy of geometric constructions depends largely on the accuracy and attention of the worker. It is necessary to keep in mind the following:

the drawn lines should be thin and they should be drawn with a hard pencil; the point in the drawing should be set as the point of intersection of two lines - straight lines, arcs of circles or straight line and the arc of a circle. In all cases the angle between these

lines must be straight or close to it (Fig. 1). It is desirable to draw a line through two points located farther away from each other, as the possibility of deviation of the line from its true direction increases when the points get closer to each other.



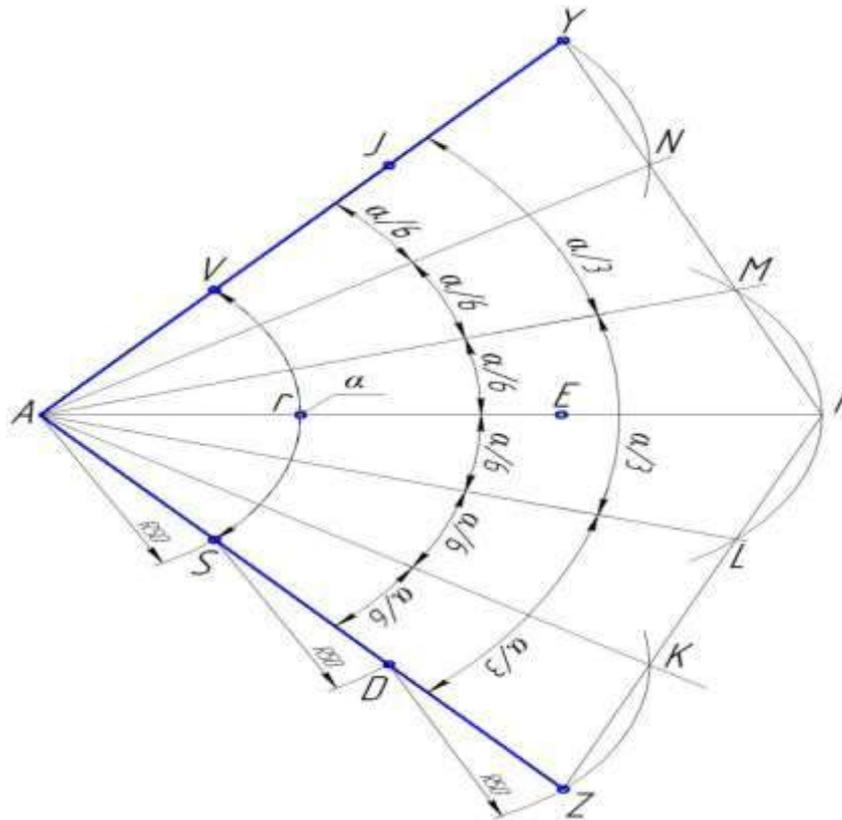
**Figure 1. Angle between lines**

Figure 2 shows the developed method of dividing an arbitrary angle into three and six equal parts:

- taking  $\alpha$  as vertex A of a given angle, draw an arc of arbitrary radius R to cross the sides of the angle at points B and S;
- divide arc BS in half in the same way as in the line segment. The line of arc division will pass through vertex A and will be the bisector of the angle, i.e. it will divide it into two equal parts, the bisector will intersect with arc BS in point D;
- using points S, D, and S as centers, draw arcs of radius  $R = AS$  to extend line AS in point E, also

on line AG in point E, also on line AB in point G;

- taking points E, F and G as centers, draw arcs of radius  $R = SE$  through line AE in point E, also on line AE in point I, and on line AG in point Y;
- points N, I and Y are connected by a straight line, the line NI intersects the arcs of the circle in the points K and L, also connect the points I and Y by a straight line, the line YI intersects the arcs of the circle in the points M and N;
- from vertex A draw rays through points K, L, M and N - we obtain the angle  $SL = LAM = MAY = 1/3$  of the given angle  $\alpha$ ; the angle  $SL = SAL = LAI = IAM = MAN = NAY = 1/6$  (Fig. 2).



Thus, we can conclude that the division of an obtuse angle into three and six equal parts, is acceptable for accurate graphical construction and making gear sector machine parts.

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## **MODELING OF AEROBIC BIOLOGICAL WASTEWATER TREATMENT PROCESSES WITH ACTIVATED SLUDGE**

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### **ABSTRACT**

*The article under discussion depicts modeling of aerobic biological wastewater treatment processes with activated sludge. The authors of the article consider that methods of biological wastewater treatment are currently widely used, namely - aerobic biological treatment methods with the help of activated sludge microorganisms. The main elements of the technological scheme of aerobic biological treatment facilities are aeration tanks - aeration tanks for biochemical processes of oxidation of organic pollutants and secondary settling tanks for separation of activated sludge from treated wastewater. Organic substances in fine, colloidal and dissolved states are subjected to biological treatment, during which the biochemical processes of oxidation by microorganisms of activated sludge are realized.*

**KEY WORDS:** *modeling, aerobic wastewater, activated sludge microorganisms, organic pollutants, biological treatment, colloidal, technological processes of production, mineral contaminants.*

### **DISCUSSION**

At present, the ecological protection of the natural environment from its pollution by industrial wastes and domestic sewage of settlements is a great scientific and technical problem. Entry of organic and mineral contaminants into water and soil basins occurs with the discharge of municipal and industrial

wastewater generated during the implementation of technological processes of production and processing of products and in the process of human activity. A distinctive feature of wastewater discharged into municipal sewage treatment plants is that they are largely free of large inclusions of mineral origin, largely contaminated with organic matter. In this



regard, there is a need for construction of complex treatment facilities, providing indicators of purification from organic compounds, set by the state environmental authorities [1].

Treatment of highly contaminated wastewater has a number of features that significantly complicate the use of conventional, widespread methods of treatment of organ-containing wastewater. Municipal wastewater contains a wide range of organic carbon-, nitrogen- and phosphorus-containing contaminants in dispersed, colloidal and dissolved states. Dispersed contaminants (mainly coarse- and medium-dispersed particles), which are in suspended state, are separated from the waste water by various methods in the process of mechanical treatment (mainly by gravitational sedimentation in primary sedimentation tanks) and removed from sewage treatment plants to sludge beds. Organic substances in fine, colloidal and dissolved states are subjected to biological treatment, during which the biochemical processes of their oxidation by microorganisms of activated sludge are realized. In this case, the effectiveness of biological treatment facilities (aero tanks, biofilters, secondary settling tanks) is largely determined by the concentration of wastewater contaminants that have previously undergone mechanical treatment [2].

Currently, methods of biological wastewater treatment are widely used, namely - aerobic biological treatment methods with the help of activated sludge microorganisms. The main elements of the technological scheme of aerobic biological treatment facilities are aeration tanks – aero tanks for biochemical processes of oxidation of organic pollutants and secondary settling tanks for separation of activated sludge from treated wastewater. Organic substances in the fine, colloidal and dissolved state are subjected to biological treatment, during which the biochemical processes of oxidation by microorganisms of activated sludge are realized [5].

The effectiveness of sewage treatment plants is determined primarily by the perfection of the technological scheme, the optimal coordination of modes of its main elements (aero tank and secondary settling tank) and the choice of scientifically based design and technological solutions in the design and construction.

Therefore, to achieve high cleaning performance, satisfying the requirements of environmental authorities, it is necessary to study the biological and hydraulic processes occurring in cleaning systems during their operation in industrial conditions.

According to modern views the solution to the problem of optimizing the performance of treatment systems can be found only by modeling the biological and hydrodynamic processes taking place

in the treatment facilities. The existing biological models, in particular, the most commonly used Mono and Herbert models are considered. Existing theoretical and experimental works on the research of microbiocenoses of biological wastewater treatment facilities and compositions of organic substrate coming for treatment have been analyzed.

Activated sludge functioning in wastewater treatment plants is a living consortium, which has a complex structure. The biocenosis of activated sludge consists mainly of microorganisms associated with trophic and metabolic processes that result in wastewater treatment.

Managing mixed cultures of microorganisms under conditions of continuous processes of biochemical oxidation of organic pollutants is one of the promising ways to maximize the biological activity and oxidative capacity of activated sludge microorganisms. In this regard, studying the kinetics of growth, life activity and die-off of mixed microbial populations in the biomass of activated sludge is an urgent and important task. Proper selection of effective technological schemes of purification and optimization of compositions of activated sludge biocenoses are the main ways to achieve high purification rates and reduce excessive biomasses of activated sludge. Purposeful regulation of the vital activity of microbial populations contributes to reducing the content of pathogenic microflora in wastewater to sanitary norms and obtaining maximum efficiency of biochemical processes of oxidation of organic pollutants by microorganisms [2].

One of the main ways to intensify aerobic biological wastewater treatment is to increase the concentration of interacting components involved in the process, microorganisms and dissolved oxygen. To achieve these goals, facilities with higher doses of activated sludge, with the use of technical oxygen, with more efficient use of oxygen, with more productive aerators, etc. have been developed. However, even these possibilities were not unlimited, mainly due to the limited intensity of diffusion processes in aeration structures. As recent studies show, to overcome this shortcoming, it is necessary to provide a longer contact time of the treated medium with the oxygen source, to increase the surface of the "liquid-oxygen" phase interface and to implement a more rapid renewal of their boundaries. Implementation of these directions has led, on the one hand, to the creation of deep (mine) aeration tanks, and on the other hand, to the use of biological systems with attached (immobilized) microflora.

The attachment of microorganisms to the solid medium increases the duration of their stay in the reaction medium. The latter circumstance is of no small importance in view of the cost of disposal of



large amounts of biomass of activated sludge. In biological layers formed on the solid surface of the carrier, at a steady mode of bioreactor an equilibrium between the processes of biofilm growth and leaching from the carrier layer is established. In this regard, there is no need for biomass recycling, fundamentally necessary for wastewater treatment in traditional aeration tanks, working on dispersed biomass. In addition, it should be noted a lower moisture content of biofilm compared to the activated sludge biomass of traditional aeration tanks, and thus a more effective separation of biofilm from treated water in the secondary settling tanks.

It is also important for aerobic biological immobilized systems that in a three-phase environment consisting of liquid, gas and solid carrier, the efficiency of oxygen use is increased. The dose of attached biomass of activated sludge developing on the surface of the solid carrier is 30 g/l or more in ash-free matter, which is completely unattainable for traditional aeration tanks with any method of thickening of activated sludge.

## CONCLUSION

However, despite the above advantages, the method of immobilization of microorganisms on a solid carrier has not yet found wide application in the industry. This is explained by the fact that the available information on biological treatment with the use of biomass immobilization technique in scientific and technical literature is not systematized, often contradictory and, as a rule, inaccessible to a wide range of specialists in the field of industrial wastewater treatment.

The introduction of immobilization of microbial biomass into the practice of wastewater treatment is significantly complicated by the lack of a unified calculation methodology and recommendations for the hardware design of the treatment process in industrial conditions. The available literature data on the high efficiency of immobilization technique for biological removal of carbon-containing organics, nitrification and denitrification either contain fragmentary material or are totally unsuitable for practical use in designing sewage treatment plants. The development of industrial technology of biological wastewater treatment in immobilized beds requires extensive experimental and theoretical research of physical and biological processes both in the laboratory and under industrial conditions. Such studies, including the study of hydrodynamics and kinetics of biological processes of synthesis of biomass and assimilation of organic pollutants in wastewater, will ensure the creation of the most rational and efficient design schemes of aerobic biological treatment facilities.

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## **INCIDENCE OF FUNGAL DISEASES OF TOMATO IN SEED PRODUCING FIELDS**

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### **ABSTRACT**

*The article presents research results conducted on the study of the spread and development of fungal diseases in tomato fields for seed production in the condition of Tashkent region.*

**KEYWORDS:** *disease, fungi, alternaria, septoria, phytophthora, fusarium, seed, powdery mildew, gray mold.*

### **INTRODUCTION**

The most reliable guarantee of high yields from vegetable crops is healthy and best quality seeds. Seed quality is affected by a number of factors, among which are primarily diseases caused by fungi.

The occurrence of fungal diseases in agricultural crops in the fields to produce seeds and their development in these fields negatively affect not only the yield of seeds, but also their quality. Seeds collected from infected plants are too small in size, shrivelled and have a very low germination capacity. The most dangerous aspect of this case is that seeds harvested from diseased plants are a source of infection, and when they are used for planting it can lead to the emergence and spread of the diseases in new fields. Seedlings germinated from such seeds are weak and stunted, slow in growth and development. They are susceptible to the

stresses of the external environment, especially to pests and diseases.

Tomato is one of the most widely grown vegetable crops in our republic. Tomato seeds produced in the country do not meet the needs of the vegetable growing industry. The main reason for this is that there are not enough seed producing farms to produce not only tomato seeds but also other vegetable crops, and the seed production in these existing farms does not meet the selection requirements. It is important to study the spread and development of diseases and identify their pathogens in the development of controlling measures for tomato diseases [1, 3, 4, 6].

### **MATERIALS AND METHODS**

In order to study and solve the above problems, research work was carried out in 2017-2020 on the identification of the incidence and development of



fungal diseases of tomatoes in the fields for seed production on the farms in Tashkent region. For this purpose, the pathogens and development of diseases in these farms were identified and phytopathological and mycological analysis of the samples of infected tomato plants and their seeds collected from the disease spread fields was performed in the laboratory of the Department of Agrobiotechnology of Tashkent State Agrarian University.

Incidence of fungal diseases of tomato plant has been calculated according to this formulae:

$$P = \frac{100 \times n}{N},$$

here,

*P*- disease incidence, %;

*N*- total number of surveyed plants;

*n*- number of plants with disease symptoms [2].

Severity of diseases in tomato plant has been determined on the base of a 5-score scale method [2].

Here:

**score**                      **Percentage (%)**

- 0    – 0 healthy plant;
- 1    – 10% infected plant;
- 2    – 11-25% infected plant;
- 3    – 26-50% infected plant;
- 4    – over 50% infected plant.

For the calculation of the expression with scores of the development level of tomato diseases in the percentage, the following formulae has been used:

$$R = \frac{(\sum a \times b)}{N \times k},$$

Here,

**R** – Severity of the disease, %;

**∑a·b**- the sum of multiplication of the number of infected plants (**a**) with respective scores (**b**);

**N**- total number of surveyed plants (healthy and infected);

**K**- number of scores in the scale [2].

A moisture chamber method was used to isolate pure cultures of fungi from diseased tomato plants and seeds. To do this, filter paper was placed on the bottom of a Petri dish, and sterilized in an autoclave for 30 minutes at a temperature of 121°C under 1 atmosphere pressure, and a moisture chamber was prepared. The parts and seeds of the tomato plant to be inspected were cleaned of microorganisms by sterilizing their outer parts. For sterilization, the plant part was immersed in 1% sodium hypochlorite solution for 0,5-1 min, then washed 3-4 times with sterilized water. The filter papers on the Petri plates were then moistened with sterilized water in front of the alcohol lamp flame and the plant was cut into 1-3 cm pieces using a scalpel heated in the flame and were placed by 4-6 pieces on each plate. Petri

dishes with plant parts were placed in thermostats with a temperature of 24-26°C. From the third day, Petri dishes were observed and fungal mycelia or spores formed on the surface of the plant parts were inoculated into the oblique wort agar medium in the test tube. After the fungi in the test tube had grown well, its type was identified [5].

## RESULTS AND DISCUSSION

The study identified six diseases caused by fungi in open fields of tomato. These are Alternaria, Botrytis, Septoria, Powdery mildew, Phytophthora, and Fusarium wilt (Table 1).

The spread and development of this disease occurred differently in the fields of Tashkent region. Fusarium and Alternaria diseases were mostly recorded than the remaining diseases, their spread constituted 42,8-55,3% and 32,8-46,7% and the development was 23,7-31,6% and 19,3-26,4% respectively. Powdery mildew disease of tomato plant was observed only for one year. It was firstly found in 2018 on the farm “Yahyo hoji” in Parkent district and its incidence made 1,4% while the development was found to be 0,8%.



**Table-1**  
**The Spread of Fungal Diseases of Tomato in the Fields of Tashkent Region**

№	Tomato diseases	Disease agent	Incidence and severity of diseases over the years								
			In 2017			In 2018			In 2019		
			Spread of disease, %	Severity of disease, %	Disease index, %	Spread of disease, %	Severity of disease, %	Disease index, %	Spread of disease, %	Severity of disease, %	Disease index, %
1.	Alternaria	<i>Alternaria solani</i> (Ell. et Mart.) Sorauer	32,8	19,3	6,3	46,7	26,4	12,3	39,4	22,8	9,0
2.	Botrytis or gray rot	<i>Botrytis cinerea</i> Pers.	17,7	10,1	1,8	7,6	4,5	0,3	12,6	7,3	0,9
3.	Septoria or white spot	<i>Septoria lycopersici</i> Speg.	5,3	1,9	0,1	13,2	4,0	0,5	8,2	2,1	0,2
4.	Powdery mildew	<i>Erysiphe communis</i> Grex. or <i>Oidium lycopersicum</i> Cooke et Mass.	-	-	-	1,4	0,8	0,01	-	-	-
5.	Phytophthora	<i>Phytophthora infestans</i> De Bary	14,1	6,5	0,9	4,9	2,9	0,1	7,8	3,5	0,3
6.	Fusarium	<i>Fusarium oxysporum f. lycopersici</i> (Sacc.) Snyder et Hans.	42,8	23,7	10,1	55,3	31,6	17,5	49,1	28,4	13,9



The diseases botrytis and phytophthora stopped developing in the infected organs of tomatoes with an increase in air temperature and a decrease in air humidity. When they were observed, their spread rate made 7,6-17,7% and 2,9-14,1% and their development 4,5-10,1% and 2,9-6,5% respectively.

Septoria disease of tomato was noted to infect only the leaves of the plant and the prevalence of the disease was 5,3-13,2% while the development was 1,9-4,0%. When disease incidence in tomato plants was analyzed by the years, the rate varied depending on the type of diseases. In 2017, there was much more precipitation which led to higher spread and development of the diseases botrytiosis (17,7% and 10,1%) and phytophthora than in previous years. It was noted that the prevalence and development of alternariosis, septoria and fusarium wilt diseases were higher in 2018 and 2019, when air humidity was relatively lower during the growing season.

## CONCLUSION

The fungal diseases alternaria, gray mold rot, septoria, powdery mildew, phytophthora, fusarium wilt were recorded in the fields of tomato for the production of seeds.

Among the identified diseases of tomato, fusarium wilt and alternaria diseases were found the most common and widespread in seed-producing fields.

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