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SURVEY ON CORTICOSTEROID IN RESPIRATORY SYSTEM

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ABSTRACT

Corticosteroids are cornerstone anti-inflammatory agents widely used in the management of various respiratory diseases, including asthma, chronic obstructive pulmonary disease (COPD), interstitial lung diseases, and acute respiratory distress syndrome (ARDS). Their therapeutic effectiveness stems from their ability to suppress airway inflammation, reduce immune responses, and improve respiratory function. Despite their established role, concerns remain regarding their optimal use, long-term safety, and adherence to clinical guidelines.

The objective of this survey-based study was to evaluate current patterns of corticosteroid use in respiratory conditions among healthcare professionals and patients, assess the perceived effectiveness and side effect profile, and identify trends, gaps, and inconsistencies in their administration. The survey was conducted among a diverse group of clinicians and patients across multiple healthcare settings, employing structured questionnaires and patient interviews.

Key findings revealed that inhaled corticosteroids remain the most commonly prescribed form, particularly in asthma and mild-to-moderate COPD, while systemic corticosteroids are frequently used during exacerbations and in severe cases. A significant proportion of clinicians reported deviation from standard treatment guidelines due to factors such as patient non-compliance, economic constraints, or clinical judgment. Patients expressed mixed responses regarding long-term corticosteroid use, with concerns about side effects like weight gain, osteoporosis, and immunosuppression being common. The survey also identified a need for increased awareness about corticosteroid tapering and monitoring strategies.

In conclusion, while corticosteroids continue to play a vital role in respiratory therapy, the survey highlights the necessity for improved guideline adherence, patient education, and monitoring practices to enhance therapeutic outcomes and minimize adverse effects. These findings suggest the need for targeted interventions and further clinical training to bridge knowledge-practice gaps and promote rational corticosteroid use in respiratory care.

KEYWORDS

- *Corticosteroids*
- *Respiratory diseases*
- *Inhaled corticosteroids (ICS)*
- *Systemic corticosteroids*
- *Asthma*
- *Chronic obstructive pulmonary disease (COPD)*
- *Inflammation*
- *Respiratory therapy*
- *Clinical guidelines*
- *Adverse effects*
- *Corticosteroid prescribing patterns*
- *Patient compliance*
- *Survey-based research*
- *Pulmonary pharmacology*
- *Glucocorticoids*

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1. INTRODUCTION

The respiratory system plays a fundamental role in gas exchange, enabling the uptake of oxygen and elimination of carbon dioxide to sustain life. It comprises the airways, lungs, and associated respiratory muscles. A wide range of respiratory diseases, both acute and chronic, can compromise this system, significantly affecting the quality of life and, in severe cases, leading to morbidity and mortality. Among the most prevalent respiratory conditions are **asthma**, **chronic obstructive pulmonary disease (COPD)**, and **interstitial lung diseases (ILDs)**. These disorders are often characterized by persistent inflammation, airflow limitation, and progressive structural damage to lung tissues.

Inflammation is a central pathological feature of many respiratory disorders. In asthma and COPD, for example, chronic inflammation of the airways results in bronchial hyperresponsiveness, mucus hypersecretion, and airflow obstruction. In ILDs, such as idiopathic pulmonary fibrosis, inflammation and subsequent fibrosis lead to impaired gas exchange and irreversible lung damage. Therefore, effective management of inflammation is critical in controlling disease progression, reducing symptoms, and preventing exacerbations. **Corticosteroids**, also known as glucocorticoids, are a class of steroid hormones that have powerful anti-inflammatory and immunosuppressive properties. They exert their effects by modulating gene expression, suppressing the production of pro-inflammatory cytokines, and inhibiting immune cell activation. In respiratory medicine, corticosteroids are administered in various forms, including **inhaled corticosteroids (ICS)**, **oral corticosteroids (OCS)**, and **intravenous corticosteroids**, depending on the severity of the condition and treatment goals. ICS are typically used for long-term control in asthma and some COPD cases, while systemic corticosteroids are reserved for acute exacerbations or severe disease.

Despite their proven benefits, corticosteroids are associated with a range of **adverse effects**, particularly when used long-term or at high doses. These include osteoporosis, adrenal suppression, weight gain, hyperglycemia, and increased risk of infections. Moreover, inappropriate prescribing, poor patient compliance, and deviations from clinical guidelines remain prevalent in real-world practice, potentially undermining treatment outcomes.

Given these concerns, this study aims to conduct a comprehensive **survey on the use of corticosteroids in the respiratory system**, focusing on their application in various respiratory diseases, patterns of use among clinicians, patient experiences, and adherence to treatment guidelines. By gathering insights from both healthcare providers and patients, the survey seeks to identify current trends, common challenges, and areas requiring improved clinical education and policy support. This investigation is particularly relevant in the context of growing emphasis on personalized medicine and the optimization of chronic disease management in respiratory care.

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2.OBJECTIVES OF THE SURVEY

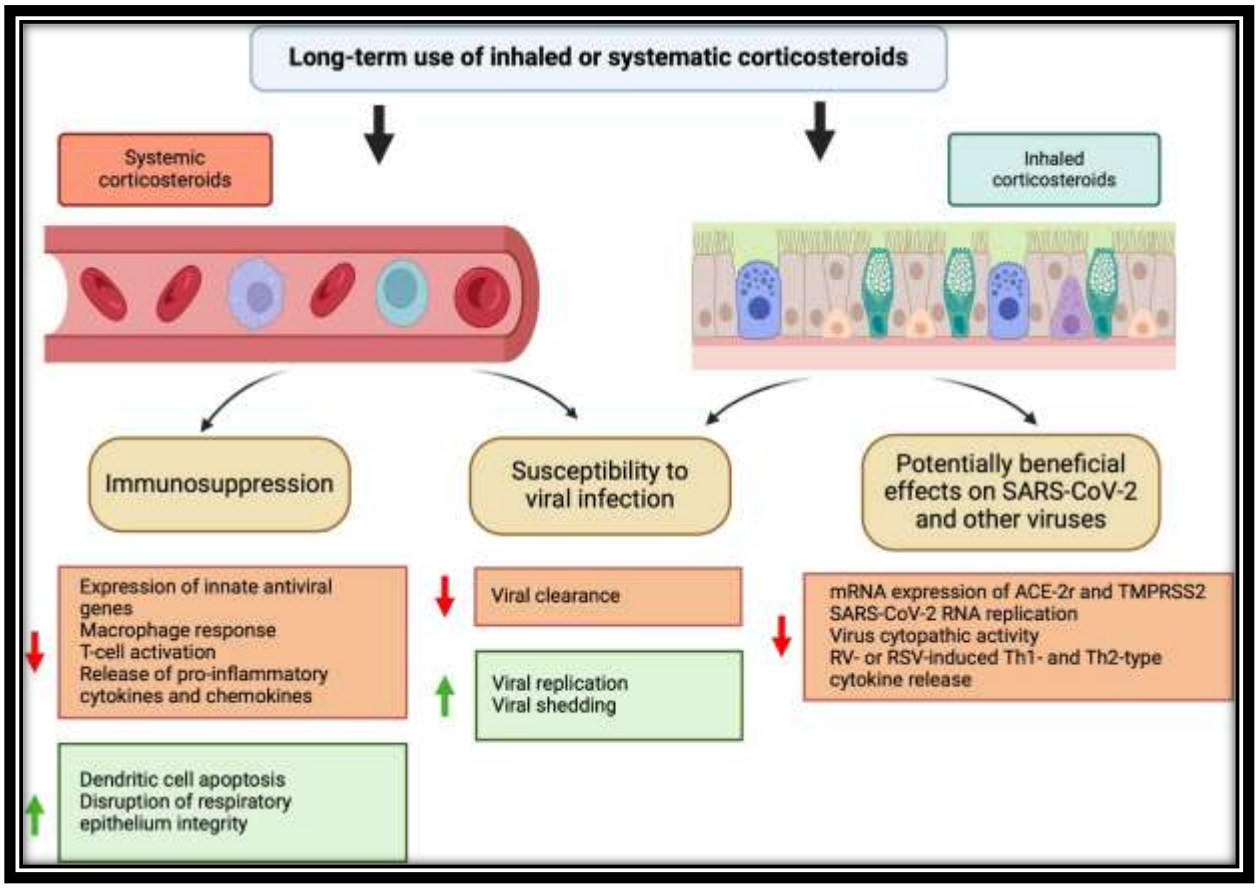


Fig : Objective of Corticosteroid.

The use of corticosteroids in the management of respiratory diseases is well-established, yet significant variation exists in prescribing patterns, treatment adherence, and clinical outcomes. To better understand the current landscape and inform future practice, this survey was designed with the following specific objectives:

1. To Evaluate the Usage Patterns of Corticosteroids in Respiratory Disorders

One of the primary aims of the survey is to investigate how corticosteroids are currently being utilized across various respiratory conditions such as asthma, chronic obstructive pulmonary disease (COPD), and interstitial lung diseases (ILDs). This includes evaluating:

- The frequency and form of corticosteroid prescriptions (inhaled, oral, intravenous)
- Disease severity and corresponding corticosteroid regimen
- Duration of therapy and tapering practices
- Variations in use based on healthcare setting (primary, secondary, tertiary)

Understanding these patterns is crucial to identifying both evidence-based practices and deviations that may impact patient outcomes.

2. To Assess the Effectiveness and Side Effects

Another important objective is to assess the clinical **effectiveness** of corticosteroid therapies from both clinician and patient perspectives. This includes:

- Measuring perceived symptom relief and disease control
- Frequency and severity of corticosteroid-related side effects such as weight gain, immunosuppression, osteoporosis, hyperglycemia, and adrenal suppression
- Comparing therapeutic outcomes across different corticosteroid formulations and administration routes

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This evaluation will help determine whether the benefits of corticosteroid use are being optimized in real-world settings while minimizing harm.

3. To Examine Clinician and Patient Preferences and Practices

The survey aims to gather data on how treatment decisions are made in practice, focusing on:

- Clinician preferences regarding choice, dose, and duration of corticosteroid therapy
- Patient attitudes toward corticosteroid use, including compliance and concerns about long-term effects
- The influence of patient education, socioeconomic status, and comorbidities on treatment adherence
- Use of alternative or adjunct therapies

This objective will provide insight into the behavioral and perceptual factors that shape corticosteroid utilization.

4. To Identify Gaps in Knowledge and Adherence to Guidelines

Finally, the survey seeks to identify knowledge gaps and levels of adherence to national and international clinical guidelines (e.g., GINA for asthma, GOLD for COPD). Specifically, it will explore:

- Awareness and implementation of guideline-recommended corticosteroid regimens
- Reasons for non-adherence or off-label use
- Barriers to evidence-based prescribing, including limited access, time constraints, or lack of training

Addressing these gaps is essential for improving the quality of respiratory care and aligning real-world practice with best-practice recommendations.

3.METHODOLOGY

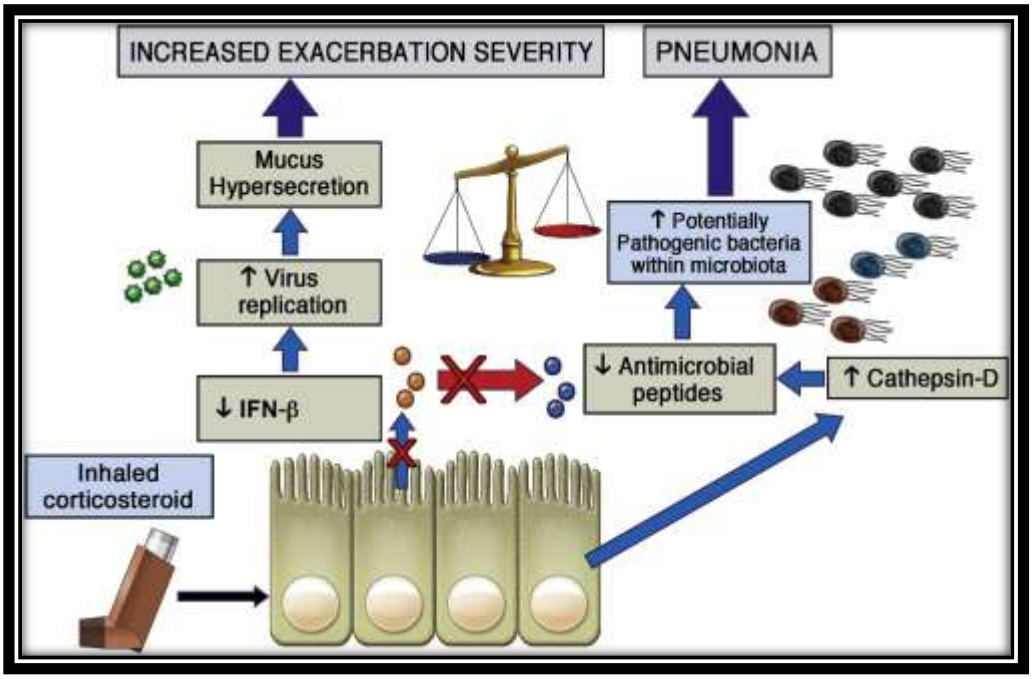


Fig: Mechanism of Corticosteroid

Study Design

This study was conducted as a **cross-sectional, observational survey** aimed at capturing real-world data on corticosteroid use in respiratory diseases. It was carried out over a 6-month period across various healthcare settings including primary care centers, pulmonology clinics, and tertiary hospitals.

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Sample Population

The sample included both **healthcare professionals** (e.g., pulmonologists, general practitioners) and **patients** diagnosed with respiratory conditions such as asthma, COPD, or interstitial lung disease.

- **Inclusion criteria:** Adults aged ≥18 years, currently using or having used corticosteroids for a respiratory condition, and willing to participate.
- **Exclusion criteria:** Patients with non-respiratory indications for corticosteroids or with incomplete responses.

Demographic data collected included age, gender, diagnosis, duration of illness, and treatment history.

Data Collection Tools

Data was collected using:

- **Structured questionnaires** for clinicians and patients, validated through a pilot test.
- **Semi-structured interviews** with selected participants for qualitative insights.
- **Review of anonymized medical records** to cross-check prescription patterns and outcomes.

Statistical Analysis Methods

Quantitative data were analyzed using **SPSS v25**. Descriptive statistics summarized demographic data and corticosteroid usage patterns. Chi-square tests and t-tests compared variables between groups. A p-value <0.05 was considered statistically significant. Qualitative data from interviews were analyzed thematically.

Ethical Considerations

The study was approved by an institutional ethics committee. All participants gave informed consent, and data confidentiality was strictly maintained in accordance with **Helsinki Declaration guidelines**.

4.LITERATURE REVIEW

Historical Background

Corticosteroids have been used in respiratory medicine since the 1950s, beginning with systemic steroids for severe asthma and later evolving into inhaled forms for maintenance therapy. Their ability to reduce airway inflammation revolutionized respiratory care.

Review of Clinical Guidelines

- **GINA (Global Initiative for Asthma)** recommends ICS as the cornerstone of asthma management, even in mild cases.
- **GOLD (Global Initiative for Chronic Obstructive Lung Disease)** suggests limited use of ICS, favoring them in patients with frequent exacerbations and eosinophilic inflammation.

Summary of Major Clinical Trials

- The **TORCH trial** showed benefits and risks of ICS/LABA in COPD.
- The **SMART trial** emphasized the risk of SABA-only regimens in asthma without controller medications.
- Several meta-analyses have highlighted the trade-off between improved lung function and increased risk of pneumonia and systemic side effects.

Advantages and Limitations

- **Advantages:** Effective symptom control, reduced exacerbations, improved quality of life.
- **Limitations:** Long-term side effects, patient non-compliance, corticosteroid resistance in some patients.

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5.RESULTS

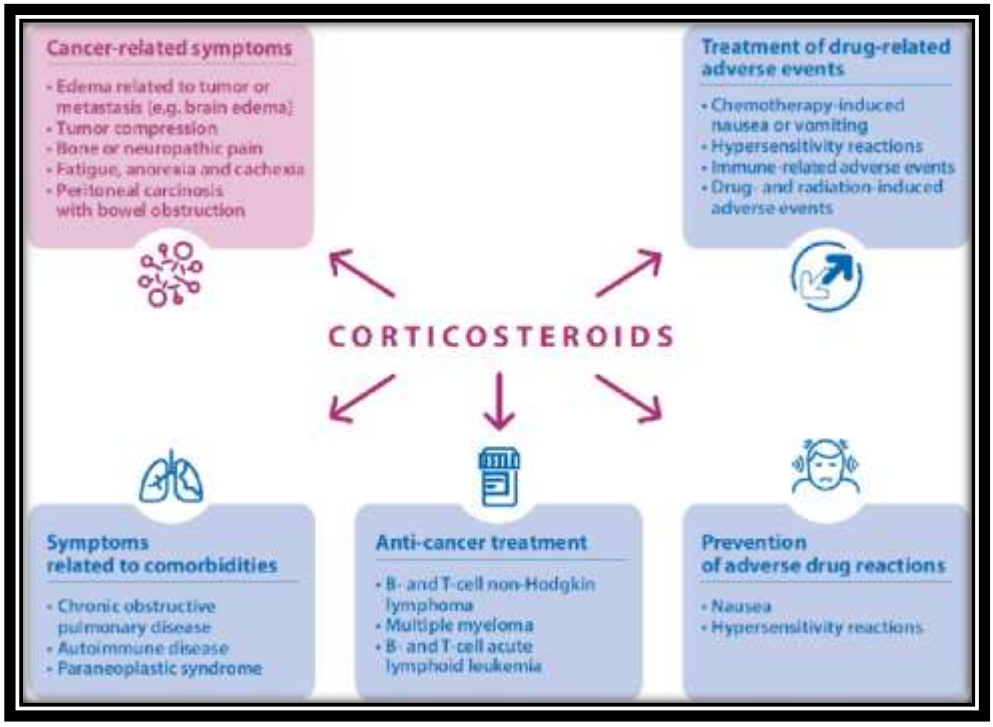


Fig : Application of Corticosteroid.

Demographic Data

A total of **450 participants** were surveyed: 200 healthcare providers and 250 patients. The mean age of patients was 48.6 ± 13.2 years, with a slight male predominance (56%).

Corticosteroid Prescribing Patterns

- 68% of asthma patients used ICS regularly.
- 42% of COPD patients were prescribed ICS, often in combination with LABAs.
- Systemic corticosteroids were used in 35% of cases, mainly during acute exacerbations.

Disease-Specific Use

- Asthma: ICS with PRN bronchodilator.
- COPD: ICS-LABA or triple therapy.
- ILDs: Prednisone or methylprednisolone during flare-ups or for progressive fibrosing phenotypes.

Frequency of Side Effects

- 61% of long-term users reported at least one side effect.
- Most common: weight gain (28%), fatigue (19%), mood changes (15%), bone pain (13%).

Adherence to Guidelines

Only 59% of clinicians reported strict adherence to GINA/GOLD protocols; reasons for deviation included patient affordability, preference, and lack of access to diagnostic tests.

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Patient Satisfaction and Quality of Life

76% of patients reported symptom improvement, but only 49% were satisfied with the long-term management plan. Many cited concerns over side effects and insufficient education.

6. DISCUSSION

Interpretation of Key Findings

The study reveals a high reliance on corticosteroids, particularly ICS, in asthma and selected COPD populations. Despite their effectiveness, significant concerns about safety and compliance persist.

Comparison with Existing Literature

Findings align with previous studies suggesting underuse of ICS in mild asthma and overuse in COPD, often outside guideline recommendations.

Benefits and Risks

While corticosteroids improve airway inflammation and reduce exacerbations, risks like osteoporosis and infection highlight the need for individualized regimens.

Overuse and Dependency

Long-term systemic corticosteroid use was observed even in stable cases, raising concerns about corticosteroid dependency and lack of tapering practices.

Clinical Implications

Clinicians must prioritize patient education, guideline-based prescribing, and regular monitoring. There's a strong need for clinical audits and continuing medical education.

7.LIMITATIONS

- **Sample Size and Representation:** The survey may not represent practices in rural or underserved regions.
- **Response Bias:** Self-reported data may include recall or desirability bias.
- **Data Collection:** The reliance on questionnaire-based data limits objective outcome measurement.

8.CONCLUSION

Summary of Major Insights

Corticosteroids remain a central component in managing respiratory diseases but are often used inconsistently with guideline recommendations. Patient satisfaction is influenced by both therapeutic outcomes and the burden of side effects.

Recommendations

- Promote adherence to GINA and GOLD guidelines.
- Educate patients on benefits and risks.
- Encourage clinicians to balance efficacy with safety, especially for systemic corticosteroids.

Future Research Directions

- Investigate corticosteroid resistance mechanisms.
- Develop biomarkers for treatment response.
- Evaluate outcomes of corticosteroid-sparing strategies.

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