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"PRESCRIPTION PATTERNS OF BRONCHODILATOR AND ANTI-INFLAMMATORY THERAPIES IN COPD MANAGEMENT IN A TERTIARY CARE HOSPITAL IN WESTERN RAJASTHAN"

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Abstract

Background: Chronic Obstructive Pulmonary Disease (COPD) is a leading cause of morbidity and mortality globally. Pharmacologic management primarily includes bronchodilators and anti-inflammatory agents. Despite the availability of well-established guidelines like GOLD and NICE, real-world prescription practices often vary.

Objective: To evaluate the prescription patterns of bronchodilator and anti-inflammatory therapies among COPD patients in a tertiary care hospital in Western Rajasthan and assess their adherence to standard treatment guidelines.

Methods: A prospective, observational, cross-sectional study was conducted over 12 months in the outpatient department of a tertiary care teaching hospital. A total of 260 diagnosed COPD patients were enrolled. Data were collected using a structured proforma and analyzed descriptively to determine drug use trends and guideline adherence.

Results: Most patients were male (88.46%) and aged 60–69 years. Salbutamol (53.85%) was the most prescribed bronchodilator, followed by budesonide (37.69%) and ipratropium (36.92%). Combination therapy was more common (66.15%) than monotherapy. The most frequently prescribed fixed-dose combination was ipratropium + salbutamol (20.77%). Overall, the prescription pattern showed moderate alignment with GOLD and NICE recommendations.

Conclusion: Bronchodilators and inhaled corticosteroid-based combinations form the cornerstone of COPD pharmacotherapy in this setting. While the prescription patterns generally adhered to international guidelines, careful consideration of overuse of certain agents and individualized therapy is recommended to enhance patient outcomes.

Keywords: COPD, bronchodilators, inhaled corticosteroids.

Introduction

Chronic Obstructive Pulmonary Disease (COPD) is a major global health concern, characterized by persistent airflow limitation and chronic respiratory symptoms that are usually progressive in nature.

It is one of the leading causes of morbidity and mortality worldwide, with projections indicating it will become the third leading cause of death by 2030 due to sustained exposure to risk factors and global population aging(11). A recent meta-analysis estimated that approximately 384 million individuals were living with COPD globally in 2010, corresponding to a global prevalence of 11.7%(12).

Effective pharmacological management of COPD primarily relies on the use of bronchodilators and anti-inflammatory agents to reduce symptoms, prevent exacerbations, and improve the overall quality of life(1). International guidelines, such as the Global Initiative for Chronic Obstructive Lung Disease (GOLD), recommend individualized therapy based on symptom burden and exacerbation history(1). Similarly, the National Institute for Health and Care Excellence (NICE) advocates a stepwise approach tailored to disease severity, incorporating both long-acting bronchodilators (LABA, LAMA) and inhaled corticosteroids (ICS) when indicated(2).

Numerous clinical trials have demonstrated the effectiveness of these pharmacologic agents. Salmeterol and fluticasone combination therapy has shown improvement in survival and lung function in patients with moderate to severe COPD(3,5). Similarly, the ISOLDE trial confirmed that fluticasone propionate reduces exacerbation frequency and slows decline in health status(4). Triple therapy including budesonide/formoterol and tiotropium has also shown significant benefits in lung function and symptom control(6).

Despite clear treatment algorithms, a growing body of evidence highlights poor adherence to established guidelines in routine clinical practice. Studies have reported both underuse of long-acting bronchodilators and over-prescription of ICS, sometimes without proper indication(7-10). Such deviations can increase the risk of adverse effects and compromise therapeutic outcomes.

In India, where COPD contributes significantly to the national burden of chronic respiratory diseases, rational prescribing practices become even more critical. However, limited data are available on real-world prescribing patterns of bronchodilators and anti-inflammatory therapies in Indian tertiary care settings, particularly in Western Rajasthan.

This study aims to analyze the current prescription patterns of these therapies among COPD patients attending a tertiary care hospital, evaluate adherence to standard guidelines, and identify potential areas for improvement in rational drug use.

Aims and Objectives

1. To evaluate the prescription patterns of bronchodilator and anti-inflammatory therapies in the management of Chronic Obstructive Pulmonary Disease (COPD) patients attending a tertiary care hospital in Western Rajasthan.
2. To assess the adherence of these prescriptions to established clinical guidelines such as GOLD and NICE for COPD management.

Methodology

This was a prospective, observational, cross-sectional study conducted over a period of 12 months in the Departments of Pharmacology and Medicine at a tertiary care teaching hospital in Western Rajasthan. COPD patients attending the Medicine outpatient department and diagnosed based on GOLD criteria were enrolled after obtaining informed consent. Data were collected using a structured proforma, including demographic details, clinical history, and prescribed medications (drug name, dose, route, frequency, and duration). Prescriptions were analyzed to determine the pattern and frequency of bronchodilator and anti-inflammatory drug use. The observed prescribing trends were then compared with standard treatment guidelines such as GOLD 2016 and NICE 2010. Statistical analysis was performed using descriptive tools to summarize the findings.

Results:

Table 1: Age and Sex Distribution of Study Patients (n = 260)

Age Group (years)	Male (n=230)	Female (n=30)	Total (%)
40–49	20	3	23 (8.85)
50–59	56	7	63 (24.23)
60–69	92	12	104 (40.00)
70–79	45	6	51 (19.61)
≥80	17	2	19 (7.31)

Most patients were in the **60–69 year** age group, indicating the higher prevalence of COPD among the elderly.

Table 2: Prescription Frequency of Major Drug Classes

Drug Class	Number of Prescriptions (%)
SABA – Salbutamol	140 (53.85%)
LABA – Formoterol	56 (21.54%)
ICS – Budesonide	98 (37.69%)
Anticholinergics - Ipratropium	96 (36.92%)
Methylxanthines - Theophylline	88 (33.85%)
Antibiotics - Amoxicillin + Clavulanic Acid	32 (12.31%)

Salbutamol was the most commonly prescribed medication, followed by budesonide and ipratropium. Fixed-dose combinations were also used frequently.

Table 3: Combination vs Monotherapy Usage

Therapy Type	Number of Patients (%)
Monotherapy	88 (33.85%)
Combination Therapy	172 (66.15%)

Most patients received **combination therapy**, indicating the preference for multi-drug regimens to control symptoms and reduce exacerbations**.**

Table 4: Common Fixed-Dose Combinations (FDCs)

FDC Components	Number of Prescriptions (%)
Salmeterol + Fluticasone	36 (13.85%)
Budesonide + Formoterol	48 (18.46%)
Ipratropium + Salbutamol	54 (20.77%)

The **ipratropium + salbutamol** combination was the most frequently used FDC, followed by **budesonide + formoterol**.

Discussion

In this study, prescription patterns among COPD patients revealed a predominant use of bronchodilators and inhaled corticosteroids, aligning broadly with GOLD 2016 and NICE 2010 guidelines. The high usage of short-acting β2-agonists (SABA) such as salbutamol reflects their role in quick symptom relief, especially in acute settings. However, their prolonged use as monotherapy may not be ideal in chronic management, where long-acting agents are preferred.

The frequent use of inhaled corticosteroids (ICS), particularly in combination with long-acting β2-agonists (LABA) such as formoterol, is consistent with evidence supporting their role in reducing exacerbations(3,4,5). Nevertheless, studies have also highlighted potential risks of overprescribing ICS in patients not at high risk for exacerbations(10).

Combination therapy was prescribed in 66.15% of cases, reflecting a clinical preference for multi-drug regimens to achieve better symptom control and quality of life. The most frequently prescribed fixed-dose combination was ipratropium + salbutamol, suggesting reliance on anticholinergic and β2-agonist synergy in bronchodilation.
These findings are similar to previous studies in Europe and Asia that observed partial adherence to guidelines in real-world settings(7,8,9). Factors such as drug availability, patient affordability, physician training, and hospital formulary policies may influence deviations.

Conclusion

The study demonstrates that bronchodilators, particularly salbutamol, and ICS-based combination therapies are the most commonly prescribed pharmacologic agents in COPD management at our tertiary care hospital. The overall prescribing pattern showed moderate to good adherence to GOLD and NICE guidelines. However, rational use of inhaled corticosteroids and improved alignment with individualized treatment strategies can further optimize patient care.

Limitations

- The study was conducted at a single tertiary care center, limiting generalizability to other settings.
- It focused only on prescription data and did not evaluate patient adherence or clinical outcomes.
- The study did not assess prescriber-level factors influencing drug choices (e.g., training or clinical reasoning).
- Inhaler technique and device appropriateness were not evaluated.

Ethical Permission

The study was approved by the Institutional Ethics Committee (IEC) of the concerned medical college. Written informed consent was obtained from all participants prior to their enrollment in the study.

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