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Drug Utilization Pattern and Clinical Profile of Patients with Chronic Obstructive Pulmonary Disease at a Tertiary Care Hospital: A Retrospective Observational Study

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Abstract

Background: Chronic obstructive pulmonary disease (COPD) remains a leading cause of morbidity and mortality worldwide and is frequently accompanied by multiple comorbidities that necessitate complex pharmacotherapy. Drug utilization studies offer valuable insight into real-world prescribing patterns and medication use.

Objective: To evaluate the drug utilization patterns among hospitalized patients with COPD at a tertiary care teaching hospital and to describe their demographic characteristics, clinical profile, comorbidities, and therapeutic class-wise distribution of prescribed medications.

Methodology: A retrospective observational study was conducted among 162 hospitalized patients diagnosed with COPD at a tertiary care teaching hospital. Data were extracted from medical records using a structured data collection form and encompassed demographic characteristics, clinical presentation, comorbidities, and prescribed medications. Drug utilization was analyzed according to therapeutic class, and descriptive statistics were used to summarize the findings.

Results: The mean age of the study population was 68.8 ± 8.13 years, and 133 (82.1%) patients were male. Dyspnea was documented in 152 (93.8%) patients, followed by chronic cough in 128 (79.0%), wheezing in 73 (45.1%), sputum production in 65 (40.1%), and chest pain in 16 (9.9%). Among the evaluated comorbidities, hypertension was present in 28 (17.3%) patients, diabetes mellitus in 21 (13.0%), previous pulmonary tuberculosis in 21 (13.0%), coronary artery disease in 19 (11.7%), and anemia in 10 (6.2%). Acebrophylline was the most frequently prescribed single-agent respiratory medication, used in 69 (42.6%) patients. Budesonide + formoterol was prescribed in 50 (30.9%) patients, whereas budesonide + glycopyrrolate + formoterol fumarate was prescribed in 45 (27.8%). Cefoperazone + sulbactam was the most frequently prescribed antibiotic combination, used in 39 (24.1%) patients. Bilastine + montelukast was prescribed in 107 (66.0%) patients, rabeprazole + domperidone in 103 (63.6%), and multivitamin/mineral preparations in 75 (46.3%).

Conclusion: This study characterizes the clinical features and prescribing patterns among hospitalized patients with COPD. Bronchodilators, inhaled corticosteroid-containing combinations, systemic corticosteroids, antibiotics, and adjunctive therapies were commonly prescribed. However, the available retrospective data were insufficient to determine guideline concordance or the appropriateness of individual treatment decisions.

Keywords: Chronic obstructive pulmonary disease; Drug utilization; Comorbidity; Bronchodilators

1. Introduction

Chronic obstructive pulmonary disease (COPD) is a progressive and preventable respiratory disorder characterized by persistent airflow limitation, chronic respiratory symptoms, and recurrent exacerbations arising from chronic airway and alveolar abnormalities. It constitutes a major cause of morbidity, mortality, and disability worldwide and imposes a substantial public health burden, particularly in low- and middle-income countries. According to the Global Initiative for Chronic Obstructive Lung Disease (GOLD), COPD is currently among the leading causes of death globally, and its burden is projected to increase further owing to population ageing, continued exposure to tobacco smoke, environmental pollution, biomass fuel exposure, and occupational hazards (1).

India contributes substantially to the global burden of COPD because of its large population, widespread tobacco consumption, indoor biomass fuel exposure,

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environmental pollution, and delayed diagnosis. A recent systematic review and meta-analysis estimated a considerable burden of COPD among Indian adults, underscoring the need for improved preventive strategies, early diagnosis, and evidence-based management (2). Beyond respiratory impairment, patients with COPD frequently experience multiple comorbidities, including hypertension, diabetes mellitus, coronary artery disease, chronic kidney disease, pulmonary hypertension, anemia, and previous pulmonary tuberculosis. These coexisting conditions complicate disease management, increase the frequency of exacerbations, prolong hospital stay, impair quality of life, and contribute significantly to healthcare expenditure and mortality (1).

The primary goals of COPD management are symptom relief, improvement in exercise tolerance and health status, prevention of disease progression, reduction in exacerbation frequency, and minimization of mortality. Current treatment strategies emphasize individualized pharmacotherapy based on symptom severity and exacerbation risk. Bronchodilators remain the cornerstone of treatment, while inhaled corticosteroids, long-acting β_2-agonists (LABAs), long-acting muscarinic antagonists (LAMAs), combination inhalers, systemic corticosteroids, antibiotics, and supportive therapies are prescribed according to disease severity and the presence of acute exacerbations. Evidence indicates that adherence to guideline-directed pharmacotherapy significantly improves clinical outcomes and reduces hospitalization and healthcare utilization (3).

Drug utilization studies provide valuable information regarding prescribing patterns, medication use, and adherence to evidence-based clinical guidelines. Such studies facilitate the identification of irrational prescribing practices, inappropriate polypharmacy, and opportunities for optimizing pharmacotherapy. They also furnish essential information for promoting rational drug use, improving patient safety, reducing treatment costs, and supporting hospital drug policy decisions. Previous hospital-based studies have demonstrated considerable variation in prescribing practices for COPD, particularly regarding bronchodilators, inhaled corticosteroids, antibiotics, and adjunctive medications (4).

Despite the increasing burden of COPD, data on drug utilization patterns and associated clinical characteristics among hospitalized COPD patients in many tertiary care hospitals in India remain limited. Evaluating prescribing practices in real-world settings is important for describing medication utilization patterns and identifying potential areas warranting further evaluation of prescribing practices.

Therefore, the present study was undertaken to evaluate the drug utilization pattern among hospitalized patients with COPD, while also describing their demographic characteristics, clinical profile, comorbidity burden, and therapeutic class-wise distribution of prescribed medications at a tertiary care teaching hospital.

2. Methods

2.1. Study Design

This study was designed as a retrospective observational study to evaluate the clinical characteristics, comorbidities, and drug utilization patterns among patients diagnosed with COPD.

2.2. Study Setting

The study was conducted in the Department of General Medicine of a tertiary care teaching hospital. Patient records were reviewed after obtaining approval from the Institutional Ethics Committee. The study was conducted over the period from March 2026 to August 2026. Patient records from this period were retrospectively reviewed for

eligibility and data collection.

2.3. Study Population

All patients admitted with a diagnosis of COPD during the study period were screened for eligibility. A total of 162 patients fulfilling the inclusion criteria were included in the study.

Inclusion and exclusion criteria: Patients aged ≥18 years with a documented diagnosis of COPD who were admitted during the study period were eligible for inclusion. Patients with duplicate records or insufficient clinical or prescription information for the study analysis were excluded. Smoking status was recorded as "not available" when it was not documented in the medical record and was not inferred from other clinical information.

COPD was identified based on a documented diagnosis of COPD in the medical record. Patients were included when COPD was recorded as an established diagnosis in the medical record. Pulmonary function test (PFT) or spirometry results were not available in the study dataset; therefore, objective spirometric confirmation of COPD could not be independently verified in this retrospective analysis. The admission diagnoses were reviewed to determine whether an acute exacerbation of COPD was explicitly documented. An acute exacerbation was considered present when the admission diagnosis included terms such as "acute exacerbation of COPD," "COPD with AE," "AECOPD," "AE COPD," or equivalent documentation.

2.4. Data Collection

Data were collected retrospectively from patient case records using a structured data collection form. The information extracted included demographic characteristics such as age, sex, smoking status, and duration of COPD. Clinical characteristics recorded were primary diagnosis, dyspnea, chronic cough, sputum production, wheezing, and chest pain. Comorbid conditions assessed included hypertension, diabetes mellitus, coronary artery disease (CAD), chronic kidney disease (CKD), pulmonary arterial hypertension (PAH), cor pulmonale, respiratory failure, bronchiectasis, previous and active pulmonary tuberculosis, lower respiratory tract infection (LRTI), community-acquired pneumonia (CAP), acute kidney injury (AKI), anemia, stroke, hepatitis B infection, hypothyroidism, and obstructive sleep apnea (OSA).

Drug utilization was assessed from inpatient prescription records, and all medications prescribed during hospitalization were recorded and classified according to their pharmacological class, including bronchodilators, inhaled corticosteroids, combination inhalers, antibiotics, systemic corticosteroids, mucolytics, gastroprotective agents, vitamin and mineral supplements, and other supportive medications.

2.5. Outcome Measures

2.5.1. Primary Outcome

To evaluate the drug utilization pattern among hospitalized patients with COPD.

2.5.2. Secondary Outcomes

- Describe the demographic characteristics of hospitalized patients with COPD.

- Evaluate the clinical characteristics and presenting symptoms of hospitalized patients with COPD.

-Determine the prevalence of comorbidities among hospitalized patients with COPD.

- Describe the therapeutic class-wise distribution of medications prescribed for the management of COPD and associated comorbidities.

2.6. Statistical Analysis

Data were entered into Microsoft Excel and analyzed using Jamovi version 2.6. Continuous variables were assessed for normality using the Shapiro–Wilk test.

Normally distributed continuous variables were expressed as mean ± standard deviation (SD), while non-normally distributed variables were summarized using median and interquartile range (IQR). Categorical variables were summarized as frequencies (n/N) and percentages (%). Descriptive statistics were used to summarize demographic characteristics, clinical features, comorbidities, laboratory parameters, respiratory support, and drug utilization patterns.

2.7. Ethical Considerations

The study protocol was approved by the Institutional Ethics Committee prior to commencement of the study. As this was a retrospective record-based study, the requirement for individual informed consent was waived by the Ethics Committee. Patient confidentiality and anonymity were strictly maintained throughout the study by removing all personal identifiers before data analysis.

3. Results

3.1. Demographic and Clinical Characteristics

A total of 162 patients diagnosed with COPD were included in the study. The mean age of the study population was 68.8 ± 8.13 years. The 82.1 % of patients was men. Assessment of data normality using the Shapiro–Wilk test demonstrated that age was normally distributed (W = 0.992, p = 0.482). The study population comprised 133 (82.1%) males and 29 (17.9%) females, indicating a marked male predominance.

Table 1. Baseline Demographic and Clinical Characteristics of Patients with COPD (N = 162)

Characteristic	Category	n (%)
Smoking Status*	Current smoker	15 (9.3%)
	Former smoker	11 (6.8%)
	Never smoker	1 (0.6%)
	Tobacco consumer	1 (0.6%)
	Known smoker	1 (0.6%)
	Not available	133 (82.1%)
Presenting Symptoms	Dyspnea	152 (93.8%)
	Chronic cough	128 (79.0%)
	Sputum production	65 (40.1%)
	Wheezing	73 (45.1%)
	Chest pain	16 (9.9%)
AECOPD		74 (45.7%)

Abbreviations: SD, Standard Deviation, AECOPD: acute exacerbation of COPD *Smoking status was recorded according to the terminology documented in the medical record. Because the source records used heterogeneous smoking-related categories, these categories were retained as documented and were not inferred or reclassified.

Dyspnea was the most frequently reported presenting symptom, occurring in 152 (93.8%) patients, followed by chronic cough in 128 (79.0%) patients. Sputum production was reported in 65 (40.1%) patients, while wheezing was documented in 73 (45.1%) patients. Chest pain was reported in 16 (9.9%) patients. Smoking-status information was available for 29 patients; among these, 15 (9.3% of the total study population) were current smokers, 11 (6.8%) were former smokers, 1 (0.6%) was a never smoker, 1 (0.6%) was recorded as a tobacco consumer, and 1 (0.6%) was recorded as a known smoker. Smoking status was not available for 133 (82.1%) patients. Among the 162 included patients, 74 (45.7%) had an acute exacerbation of COPD explicitly documented in the admission diagnosis. The remaining patients had COPD documented

with other diagnoses or without explicit documentation of acute exacerbation. Therefore, treatment patterns were evaluated across the overall hospitalized COPD population and were not assumed to represent treatment exclusively for AECOPD.

3.2. Comorbidity Profile

Among the evaluated comorbidities, hypertension was the most frequently observed condition, present in 28 (17.3%) patients, followed by diabetes mellitus and previous pulmonary tuberculosis, each documented in 21 (13.0%) patients. Coronary artery disease was present in 19 (11.7%) patients. Respiratory failure, lower respiratory tract infection, and bronchiectasis were each observed in 12 (7.4%) patients. Chronic kidney disease, anemia, and pulmonary arterial hypertension were each reported in 10 (6.2%) patients. Community-acquired pneumonia was present in 8 (4.9%) patients, while cor pulmonale and acute kidney injury were identified in 7 (4.3%) and 6 (3.7%) patients, respectively. Stroke, hepatitis B infection, and hypothyroidism were each documented in 4 (2.5%) patients. Obstructive sleep apnea was reported in 3 (1.9%) patients, while active pulmonary tuberculosis was present in 2 (1.2%) patients.

3.3. Drug Utilization Pattern

The therapeutic class-wise distribution of prescribed medications is presented in Table 2. Bronchodilators constituted one of the most frequently prescribed drug classes, with acebrophylline being the most commonly prescribed single bronchodilator (69 patients, 42.6%), followed by acebrophylline + acetylcysteine (43 patients, 26.5%) and ipratropium bromide + levosalbutamol (35 patients, 21.6%). Among inhaled therapies, budesonide + formoterol (50 patients, 30.9%) and budesonide + glycopyrrolate + formoterol fumarate (45 patients, 27.8%) were the most frequently prescribed combination inhalers.

Among antibiotics, cefoperazone + sulbactam was the most commonly prescribed agent (39 patients, 24.1%), followed by cefuroxime + clavulanic acid (37 patients, 22.8%) and clarithromycin (36 patients, 22.2%). Deflazacort (35 patients, 21.6%) and systemic corticosteroids (23 patients, 14.2%) were the most frequently prescribed corticosteroids.

Among antitussive, mucolytic, and antiallergic medications, bilastine + montelukast was the most frequently prescribed drug (107 patients, 66.0%), followed by levodropropizine + chlorpheniramine (21 patients, 13.0%). Gastroprotective agents were widely utilized, with rabeprazole + domperidone prescribed to 103 patients (63.6%). Nutritional supplementation was also common, particularly multivitamin and mineral supplements (75 patients, 46.3%), followed by probiotic supplements (22 patients, 13.6%) and calcium with vitamin D/calcitriol supplementation (18 patients, 11.1%).

Among cardiovascular medications, torsemide + spironolactone (19 patients, 11.7%) and antiplatelet agents (12 patients, 7.4%) were the most frequently prescribed. Antidiabetic medications, including metformin (11 patients, 6.8%) and glimepiride + metformin (8 patients, 4.9%), were prescribed to patients with concomitant diabetes mellitus. In addition, 14 patients (8.6%) required in-hospital non-invasive ventilation (NIV) support during their hospital stay.

Table 2. Drug Utilization Pattern According to Therapeutic Class Among Patients with COPD (N = 162)

Therapeutic Class	Medication Type	n (%)
Bronchodilators	Acebrophylline	69 (42.6%)
	Acebrophylline + Acetylcysteine	43 (26.5%)
	Ipratropium Bromide + Levosalbutamol	35 (21.6%)
	Glycopyrronium	16 (9.9%)
	Glycopyrronium + Formoterol Fumarate	8 (4.9%)
	Lupihaler	15 (9.3%)
	Levosalbutamol + Ambroxol + Guaifenesin	1 (0.6%)
Inhaled Corticosteroids/Combination Inhalers	Budesonide + Formoterol	50 (30.9%)
	Budesonide + Glycopyrrolate + Formoterol Fumarate	45 (27.8%)
	Fluticasone + Formoterol + Glycopyrronium	20 (12.3%)
	Nebulized Budesonide	1 (0.6%)
Systemic Corticosteroids	Deflazacort	35 (21.6%)
	Hydrocortisone/Systemic Corticosteroids	23 (14.2%)
Antibiotics	Cefoperazone + Sulbactam	39 (24.1%)
	Cefuroxime + Clavulanic Acid	37 (22.8%)
	Clarithromycin	36 (22.2%)
	Cefuroxime	20 (12.3%)
	Cefpodoxime	11 (6.8%)
	Piperacillin + Tazobactam	8 (4.9%)
	Ceftriaxone	6 (3.7%)
	Azithromycin	5 (3.1%)
	Amoxicillin + Clavulanic Acid	3 (1.9%)
Antitussives/Mucolytics/Antiallergics	Bilastine + Montelukast	107 (66.0%)
	Levodropropizine + Chlorpheniramine	21 (13.0%)
	Cetirizine + Montelukast	5 (3.1%)
	Erdosteine	3 (1.9%)
Gastroprotective Agents	Rabeprazole + Domperidone	103 (63.6%)
	Proton Pump Inhibitors	6 (3.7%)
	Esomeprazole + Domperidone	3 (1.9%)
	Esomeprazole	1 (0.6%)
	Domperidone	1 (0.6%)
Vitamins & Nutritional Supplements	Multivitamin & Mineral Supplement	75 (46.3%)
	Probiotic Supplement	22 (13.6%)
	Calcium + Vitamin D/Calcitriol Supplement	18 (11.1%)
	Iron + Folic Acid + Methylcobalamin Supplement	10 (6.2%)
	Glutathione	7 (4.3%)
	Coenzyme Q10 + L-Carnitine Combination	1 (0.6%)
Antidiabetic Agents	Metformin	11 (6.8%)
	Glimepiride + Metformin	8 (4.9%)
	Insulin	4 (2.5%)
	Linagliptin*	1 (0.6%)
Cardiovascular Drugs	Torsemide + Spironolactone	19 (11.7%)
	Antiplatelet Agents	12 (7.4%)
	Amlodipine	2 (1.2%)
	Sildenafil Citrate	2 (1.2%)
	Telmisartan + Hydrochlorothiazide	1 (0.6%)
Other Medications	Gabapentin + Nortriptyline	4 (2.5%)
	IV Magnesium Sulfate	2 (1.2%)
	Amitriptyline	1 (0.6%)
	Desmopressin	1 (0.6%)
	Levothyroxine Sodium	1 (0.6%)
	Mirabegron	1 (0.6%)
	Rifaximin	1 (0.6%)
	Polyethylene Glycol 3350	1 (0.6%)
	Liquid Paraffin + Magnesium Hydroxide	1 (0.6%)
	Naproxen + Domperidone†	1 (0.6%)
Respiratory support	Non-invasive Ventilation (NIV) Support	14 (8.6%)

4. Discussion

The present retrospective observational study evaluated the clinical profile, comorbidity burden, and drug utilization pattern among 162 hospitalized patients with COPD. The findings demonstrate that COPD predominantly affected elderly male patients and was associated with a substantial burden of comorbidities, particularly hypertension, diabetes mellitus, anemia, and cardiovascular disease. Bronchodilators, inhaled corticosteroid (ICS)-based combination therapies, antibiotics, gastroprotective agents, and nutritional supplements constituted the major components of pharmacological management. The present study included hospitalized patients with COPD, of whom 74 (45.7%) had an acute exacerbation of COPD explicitly documented in the admission diagnosis. Because the cohort also included patients hospitalized with COPD and other coexisting conditions without an explicitly documented exacerbation, the observed prescribing patterns should be interpreted as representing the overall hospitalized COPD population rather than treatment specifically for AECOPD (4).

The mean age of the study population was 68.8 ± 8.13 years, with males accounting for 82.1% of the study population. These findings are consistent with the established epidemiology of COPD, in which advancing age remains one of the strongest risk factors because of cumulative exposure to tobacco smoke, biomass fuel, occupational pollutants, and age-related decline in pulmonary function. Male predominance has also been consistently reported in hospital-based studies from India, although the gender gap is gradually narrowing because of increasing smoking rates and biomass fuel exposure among women. Recent systematic reviews continue to identify smoking as the principal modifiable risk factor for COPD, while emphasizing the increasing contribution of environmental and occupational exposures (2).

Dyspnea and chronic cough were the most frequently reported presenting symptoms in the present study, reflecting the characteristic clinical manifestations of COPD. Similar observations have been reported in previous observational studies, in which progressive dyspnea and chronic productive cough represent the predominant symptoms leading to hospitalization during acute exacerbations (5). Symptom burden in hospitalized patients is generally greater than in stable COPD, emphasizing the importance of prompt recognition and optimized pharmacological management to reduce morbidity and improve quality of life (1).

The present study also demonstrated a considerable burden of comorbid conditions. Hypertension, diabetes mellitus, anemia, CAD, previous pulmonary tuberculosis, CKD, PAH, bronchiectasis, and respiratory failure were among the most frequently documented comorbidities. The coexistence of multiple chronic diseases in COPD has important implications because these conditions contribute to increased symptom severity, recurrent exacerbations, prolonged hospitalization, healthcare costs, and mortality. Cardiovascular disease and diabetes are particularly important because systemic inflammation, oxidative stress, and shared risk factors accelerate disease progression (6). Likewise, previous pulmonary tuberculosis and bronchiectasis are common in South Asian populations and further complicate long-term respiratory outcomes. These findings reinforce the need for comprehensive multidisciplinary management rather than treatment directed solely at airflow limitation (7).

Evaluation of prescribing practices showed frequent use of bronchodilator and combination therapies. Acebrophylline was the most frequently prescribed single respiratory medication, followed by

acebrophylline with acetylcysteine and ipratropium bromide with levosalbutamol. Although these medications were frequently used in the present cohort, the retrospective dataset did not contain sufficient information to determine the specific clinical rationale for their selection or their comparative appropriateness for individual patients. Thus, the frequency of acebrophylline-based prescribing should be interpreted as an observed utilization pattern rather than as evidence of guideline-concordant therapy. Bronchodilators remain the primary therapeutic option for symptom control in COPD because they improve airflow, reduce hyperinflation, and decrease exacerbation frequency (8). The widespread use of inhaled combination therapies containing inhaled corticosteroids, long-acting β_2-agonists (LABA), and long-acting muscarinic antagonists (LAMA) was observed in the study population. However, detailed information on COPD severity, previous exacerbation history, eosinophil counts, and the clinical indications for inhaled corticosteroid use was not available. Therefore, the appropriateness or guideline concordance of individual inhaled regimens could not be determined from the present dataset (1, 3). Contemporary evidence supports triple inhaled therapy in appropriately selected patients because it may improve lung function, symptom control, and exacerbation prevention compared with dual therapy (9).

Antibiotics represented another major component of therapy, with cefoperazone–sulbactam, cefuroxime–clavulanic acid, and clarithromycin being the most frequently prescribed agents. The relatively frequent use of broad-spectrum antibiotics is notable; however, the present study cannot determine whether these prescriptions were clinically indicated in individual patients. Information regarding the presence and severity of bacterial infection, sputum characteristics, microbiological findings, antimicrobial susceptibility results, documented clinical indications, and treatment duration was not consistently available (10). Therefore, the observed antibiotic utilization should be interpreted as a description of prescribing practice rather than evidence of appropriate or guideline-concordant antibiotic use.

A notable finding was the frequent use of gastroprotective agents and nutritional supplements. Rabeprazole combined with domperidone was prescribed in 103 (63.6%) patients, while multivitamin and mineral supplements were prescribed in 75 (46.3%). These medications may have been used for a variety of clinical reasons, including management of gastrointestinal symptoms, concomitant medications, nutritional supplementation, or comorbid conditions; however, the specific indications were not available in the retrospective records. Their frequent use therefore represents an important prescribing pattern but cannot be interpreted as evidence of clinical necessity or appropriateness. Further prospective evaluation would be required to determine whether such supportive medications are consistently indicated and to assess their contribution to overall medication burden and polypharmacy.

Systemic corticosteroids and non-invasive ventilation (NIV) were also frequently utilized during hospitalization. Current international recommendations advocate short courses of systemic corticosteroids for moderate-to-severe acute exacerbations because they shorten recovery time, improve lung function, and reduce treatment failure. Likewise, NIV remains the standard of care for selected patients with acute hypercapnic respiratory failure, reducing the need for invasive mechanical ventilation and improving survival when used appropriately (11). These findings describe the use of systemic corticosteroids and NIV during hospitalization but do not establish

adherence to specific guideline recommendations because detailed clinical indications and disease-severity information were not available.

The present study has several strengths. It provides a comprehensive overview of demographic characteristics, clinical presentation, comorbidities, and prescribing patterns among hospitalized COPD patients treated in a tertiary care setting. Classification of medications according to therapeutic class provides a clinically meaningful overview of prescribing practices and facilitates comparison with previous drug utilization studies.

Several limitations should be acknowledged. Being a retrospective single-center study, the findings may not be generalizable to other healthcare settings. Although medication utilization was documented, the available data were insufficient to assess individual treatment decisions against guideline-specific criteria. Detailed information on COPD severity, previous exacerbation history, eosinophil counts in relation to inhaled corticosteroid use, specific indications for inhaled corticosteroids and antibiotics, microbiological findings, antimicrobial susceptibility results, and the duration of corticosteroid and antibiotic therapy was not available. Therefore, formal assessment of guideline adherence or appropriateness of individual prescriptions could not be reliably performed. Pulmonary function test results, medication adherence, treatment outcomes, and adverse drug reactions were also unavailable. Furthermore, the descriptive study design precludes causal inference regarding treatment effectiveness.

Overall, the findings describe substantial use of combination pharmacotherapy among hospitalized patients with COPD, including bronchodilators, inhaled therapies, corticosteroids, antibiotics, gastroprotective agents, and nutritional supplements. The frequent use of several adjunctive and supportive medications highlights the complexity of prescribing in this population and the potential for considerable medication burden. However, because the study was retrospective and detailed information on treatment indications, disease severity, previous exacerbation history, microbiological findings, treatment duration, and clinical outcomes was unavailable, the observed prescribing patterns cannot be used to establish the appropriateness or guideline concordance of individual prescriptions. The findings should therefore be regarded primarily as descriptive drug-utilization data and as a basis for further evaluation of prescribing practices.

5. Conclusions

The present retrospective observational study provides a comprehensive overview of the demographic characteristics, clinical profile, comorbidity burden, and drug utilization pattern among hospitalized patients with COPD in a tertiary care teaching hospital. The study demonstrated that COPD predominantly affected elderly male patients and was associated with a high prevalence of comorbidities, particularly hypertension, anemia, diabetes mellitus, and cardiovascular disease. Bronchodilators, inhaled corticosteroid-based combination therapies, systemic corticosteroids, and antibiotics constituted the major components of pharmacological management, while supportive medications such as gastroprotective agents and nutritional supplements were also frequently prescribed.

Overall, this study describes the demographic characteristics, clinical profile, comorbidities, and drug utilization patterns among hospitalized patients with COPD. Bronchodilators, inhaled corticosteroid-containing combination therapies, systemic corticosteroids, antibiotics, and supportive

medications were frequently prescribed. However, because detailed information on disease severity, exacerbation history, treatment indications, microbiological findings, and treatment duration was not available, guideline concordance and the appropriateness of individual prescriptions could not be reliably assessed. These findings highlight the need for further prospective studies incorporating clinical severity, treatment indications, outcomes, and medication-related adverse effects to better evaluate COPD pharmacotherapy.

Drug utilization studies can help characterize prescribing patterns and identify areas that warrant further evaluation of medication appropriateness, treatment indications, and medication burden. Future multicenter prospective studies with larger sample sizes and assessment of treatment outcomes, medication adherence, and adverse drug reactions are warranted to further strengthen evidence for optimizing COPD management in routine clinical practice.

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Availability of data and materials: Data are available from the corresponding author upon reasonable request.

Ethical Considerations: This retrospective study was approved by Vignan Institute of Pharmaceutical Technology Ethical Committee (approval number: [VIPT/IEC/06122378]; approval date: [06 June 2026]). The study was conducted in accordance with the ethical principles of the Declaration of Helsinki. The requirement for individual informed consent was waived by the committee due to the retrospective nature of the study and the use of previously collected patient records. Patient confidentiality was maintained throughout the study, and all data were used exclusively for research purposes

Conflicts of interest: All the authors declare that they have no conflicts of interest.

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