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Original Research Article

Study on Utilization Patterns of Drugs Used in the Treatment of Chronic Obstructive Pulmonary Disease in a Tertiary Hospital

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Abstract

Background: The condition known as chronic obstructive pulmonary disease (COPD) is characterized by abnormalities of the lung's airway that limit the amount of air that enters and exits the lungs. Ten percent of people worldwide suffer with COPD, which has a high morbidity and death rate. Controlling the symptoms and achieving a high quality of life are the goals of the treatment. The purpose of this study is to determine how various medications used to treat COPD are used at JLNMCH in Bhagalpur, Bihar.

Methods: 170 patients who underwent COPD treatment were included in this retrospective analysis. The departmental record register of COPD patients admitted to JLNMCH was used to collect patient and medication data.

Results: According to the findings, 131 patients (77.1%) were prescribed beta 2 receptor agonists, while 139 patients (81.8%) were prescribed muscarinic receptor antagonists. For 103 patients (60.6%) and 102 patients (60.0%), respectively, salbutamol and tiotropium were the most specific medications provided; 24.7% of patients received just one medication. There is proof that the use of muscarinic receptor antagonists and gender are significantly correlated.

Conclusion: This study illustrates how medications used to treat COPD at JLNMCH in Bhagalpur, Bihar, were used.

Keywords: COPD, Corticosteroids, Muscarinic Receptor Antagonists, Selective Beta-2 Receptor Agonists, Utilization Patterns.

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Introduction

Ten percent of people worldwide suffer from chronic obstructive pulmonary disease (COPD), a common condition that has a high morbidity and mortality rate.[1,2] Persistent respiratory symptoms, such as dyspnea, coughing, and/or sputum production with restricted airflow, are indicative of COPD. Patients' activities, health, and quality of life are significantly impacted by COPD symptoms.[3]

COPD is classified as "unstable" in individuals who have frequent or severe exacerbations and a rapid decline in lung function, in which case care may be more difficult, and "stable" when symptoms are effectively controlled and pulmonary decline is limited. [4]

Pharmacotherapy for COPD is used to improve exercise tolerance and health status, as well as to lessen symptoms and the frequency and intensity of exacerbations.[5] In addition to improving patient outcomes, appropriate COPD therapy can lower healthcare utilization and related expenses.[4] Short- and long-acting β-2 receptor agonists, corticosteroids, theophylline, roflumilast (phosphodiesterase 4 inhibitor), antibiotics (macrolides), and mucolytics are among the medications used to treat COPD [6]. This study sought to determine how beta-2 agonists, muscarinic receptor antagonists, corticosteroids, and methylxanthines were used in the treatment of COPD at JLNMCH, Bhagalpur, and Bihar.

Material and Methods

This was a retrospective study was conducted at Jawaharlal Nehru Medical College and Hospital, Bhagalpur, Bihar from November 2025 to January 2026. All the participants in this study were COPD patients who received medications from JLNMCH.

Data were collected from the departmental record register of COPD patients admitted to JLNMCH and used drugs' data were also collected. Patients' data include age, gender, other comorbidities, other comedications. The age was divided to three subgroups, <60, 60-80, and >80 years old. Drugs' data include group of drugs, drugs, routes of administration, number of drugs, and fixed-dose combination. Data will be analysed using statistical package for the social sciences (SPSS) software with appropriate statistical tests. Variables were reported either as mean±SD, range or as percentage. Comparisons of the prescription of drugs between age subgroups (<60, 60-80, and >80 years old) and gender (males vs females) were done by Chi square test. P <0.05 was considered as significant.

Results

The characteristics of the 170 patients who got COPD medication are displayed in Table 1. The patients' ages ranged from 42 to 103, with a mean±SD of 73.4±11.5 years. The age subgroup of 60–80 years old comprised 59.4% of the patients. Males made up the majority of the patients (74.1%).

Table 1: Characteristics of 170 patients with chronic obstructive pulmonary disease

Parameter	Result
Age(years)	
Range	61(42-103)
Mean±SD	73.4±11.5
Subgroups N (%)	
Lessthan60	21 (12.4%)
60-80	101 (59.4%)
Morethan80	48 (28.2%)
Gender N (%)	
Male	126 (74.1%)
Female	44(25.9%)
Smoking N(%)	
Smoker	37 (28.7%)
Ex-smoker	78 (60.5%)
Non-smoker	14 (10.9%)
Other comorbidities N(%)	
Hypertension	99 (58.2%)
Diabetes mellitus	50 (29.4%
Asthma	28 (16.5%)
Chronic kidney disease	22 (12.9%)

Only 10.9% of the patients were non-smokers; the majority were either smokers (28.7%) or ex-smokers (60.5%). Diabetes (29.4%) and hypertension (58.2%) were the most prevalent related comorbidities. According to Table 2, muscarinic receptor antagonists (81.8%) were the most commonly prescribed class, followed by beta-2 receptor agonists, corticosteroids, and methylxanthines.

Table 2: Utilization pattern of group of drugs

Group of Drug	No. of patients	Percentage
Muscarinic receptor antagonists	139	81.8%
Beta-2 receptor agonists	131	77.1%
Corticosteroids	117	68.8%
Methylxanthines	16	9.4%

According to Table 3, salbutamol (SABA) and tiotropium (LAMA) were the most commonly given medications. In JLNMCH, COPD was treated with two fixed-dose combination medications. Of the patients, 44% were prescribed seretidediskus, and 5.9% were taken Symbicoratturbuhaler.

Table 3: Utilization pattern of specific drugs and fixed dose combination that was prescribed to 170 patients with chronic obstructive pulmonary disease

Drug group	Specific drug	Number (%) of patients
Muscarinic receptor antagonists	Tiotropium (LAMA)	102(60 %)
	Ipratropium (SAMA)	50 (29.4%)
	Salbutamol (SABA)	103 (60.6%)
Beta-2 receptor agonists	Salmeterol* (LABA)	75 (44.1%)
	Formoterol** (LABA)	10 (5.9%)
	Fluticasone*	78 (45.9%)
	Prednisolone	27 (15.9%)
	Budesonide**	14 (8.2%)
Corticosteroids	Hydrocortisone	12 (7.1%)
	Mometasone	11 (6.5%)
	Dexamethasone	10 (5.9%)
Methylxanthines	Theophylline	16 (9.4%)
Drug group	**Fixed dose combination**	
Corticosteroids+Beta-2 receptor agonists	Seretidediskus	75 (44.1%)
Corticosteroids+Beta-2 receptor agonists	Symbicoratturbuhaler	10 (5.9%)

According to Table 4, the majority of patients received one medicine (24.7%), followed by three (21.2%) and four (20.0%). 83% of the medications were administered by inhalation, 13.9% orally, and 3.1% via injection.

Table 4: Number of COPD medications prescribed for each patient

No. of Medication of each patients	No. of patients	Percentage
1	42	24.7%
2	29	17.1%
3	36	21.2%
4	34	20.0%
5	18	10.6%
6	7	4.1%
7	4	2.4%

Male and female muscarinic receptor antagonist use differed significantly (P=0.042), as Table 5 demonstrates. The use of other categories of prescription medications, however, did not differ much. Table 3 demonstrates that there were no appreciable variations in COPD medication prescriptions among the various age groups.

Table 5: Utilization pattern of different COPD medications according to gender and age

Gender	Muscarinic receptor antagonists	Beta-2 receptor agonists	Corticosteroids	Methylxanthine
Male	85.7%	74.6%	65.1%	7.1%
Female	70.5%	84.1%	79.5%	15.9%
P value	0.042	0.280	0.111	0.129
Age (in years)				
Less than 60	71.4%	81.0%	61.9%	9.5%
60-80	85.1%	77.2%	68.3%	9.9%
More than 80	79.2%	75.0%	72.9%	8.3%
P value	0.307	0.860	0.654	0.953

***Part of fixed dose combination (Seretide diskus), **Part of fixed-dose combination (Symbicorattubuhaler)**

Discussion

Studies on drug usage are crucial for promoting sensible drug use.[7] Hospitals can assess and enhance medicine delivery and prescription practices with the use of these research.[8] The current study's findings indicate that the incidence of COPD was higher in males than in females, which is consistent with earlier research but not with other studies where only 50.1% of patients were men.[9-13] According to the current study, just 10.9% of the patients were non-smokers, with the majority being smokers or former smokers. This contradicts a prior study that found that 55.5% of the patients did not smoke.[9] According to the current study, 81.8% of patients were prescribed muscarinic receptor antagonists, followed by beta 2 agonists (77.1%), corticosteroids (68.8%), and methylthanxines (9.8%). According to Veettil et al., 97.5%, 77.5%, 25%, 72.5%, and 100% of patients with acute exacerbations of chronic COPD received inhaler beta 2 agonists, muscarinic receptor

antagonists, inhaler steroids, parenteral steroids, and methylthanxines, respectively.

According to Sawant et al., 84.5%, 84.4%, 84.5%, 73.9%, and 69.7% of patients with acute exacerbation of COPD received beta-2 agonists, muscarinic receptor antagonists, inhaler steroids, systemic steroids, and methylthanxines, respectively.[10] According to Kumar et al., beta-agonists were the most often recommended bronchodilators, followed by muscarinic receptor antagonists and methylthanxines.[11]According to the current study, 50% of patients were prescribed LABA (salmeterol and formoterol) and 60.6% of patients were prescribed SABA (salbutamol). Furthermore, 29.4% and 60% of patients received prescriptions for SAMA (ipratropium) and LAMA (tiotropium), respectively. According to Miravitlles et al., 55.3%, 55.7%, 32.1%, and 32.3% of COPD patients in primary care were prescribed SABA, LABA, SAMA, and LAMA, respectively.[14,15] Additionally, they revealed that 55.9%, 5.3%, and 15.3% of patients were prescribed oral corticosteroids, methylaxanthines, and inhaled corticosteroids, respectively. The degree of COPD and the occurrence of acute exacerbations may be the cause of variations in prescription patterns among the various studies.The current study demonstrates that the prescription of COPD drugs did not differ significantly among the various age categories. Compared to women, men were given more muscarinic receptor agonists. The use of other categories of prescription medications did not change significantly. Conversely, a prior study revealed that women were prescribed COPD medications at a considerably higher rate than men.[12] It's unclear why there is a difference.

Conclusion

This study concludes by illustrating the drug usage trends for COPD treatment in a tertiary hospital.

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