ASSESSMENT OF DRUG PRESCRIBING PATTERN IN THE MANAGEMENT OF CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN A TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Introduction: Chronic Obstructive Pulmonary Disease (COPD) is currently the fourth leading cause of death globally. Although drugs are not the only therapeutic interventions that provide desired health outcomes, study of drug prescribing patterns in the management of COPD alone or with complications helps to rationalize their use efficiently and in sufficient quantities. **Objective:** To evaluate the prescribing patterns of drugs in the treatment of COPD in the pulmonary medicine department of a 1200 bed tertiary care teaching hospital in Mangaluru. **Methodology:** A prospective cross sectional observational study was conducted in the outpatients of the pulmonary medicine department for a period of six months from September 2017 to February 2018. Prescribing patterns in the patients diagnosed with COPD with or without comorbidities was collected and analysed. The collected information was summarized using descriptive statistics. **Results:** A total of 150 patients were evaluated in the study it was found that the occurrence of COPD was predominantly higher in males (75.3%) than that in females (24. 6%). The age group in which the disease was most common was between 61 to 70 years. Smoking was identified as the major risk as 62% of the patients were smokers and 38% were non-smokers. Majority of patients diagnosed with COPD were maintained on theophylline (78.6%), followed by formoterol (47.3%) and budesonide (40.65). Antibiotics were also used, to treat secondary infections. The highest prescribed antibiotic was cephalosporin (38.7%). The most prescribed combination therapy was formoterol + budesonide (40%). **Conclusion:** Prescribing pattern provides a classic frame of trends in prescribing according to various general practitioners and it will help to improve patient management by rationalizing drug use.

Keywords- COPD, prescribing patterns, methylxanthines, bronchodilators, antibiotics

INTRODUCTION:

Chronic Obstructive Pulmonary Disease (COPD) is a common, preventable and treatable condition that is characterised by persistent airflow limitation that is due to airway and/or alveolar abnormalities that is usually caused by significant exposure to noxious particles or gases [1]. WHO estimates suggest that 90% of COPD-related deaths occur in low and middle income countries with India and China accounting for 66% of global mortality. These increasing mortality rates relates to the increase in cigarette smoking, excessive use of biomass fuel, higher pollution levels and longer survival rates of the population [2,3].

COPD exhibits various signs and symptoms such as dyspnoea, tightness of chest, chronic cough with expectoration and excessive sputum production. As the disease progresses, two patterns of the symptom emerge which is referred to as "pink puffers" (emphysema predominant) and "blue bloaters" (bronchitis predominant). All these symptoms are valuable in the effective diagnosis of the disease along with spirometry which is used as a confirmatory test. The last stage of COPD is characterised by pulmonary hypertension, cor pulmonale, and pneumonia. The hallmark characteristic of COPD is the exacerbation of the symptoms beyond normal day-to-day variation. This includes increased frequency or severity of dyspnoea, cough and expectoration, and sputum volume or sputum characteristics. These exacerbations are often precipitated by infection (which is often bacterial than viral
Infection) or other environmental factors [4,5].

METHODOLOGY:

A prospective observational study was carried out in the pulmonary medicine department, Justice K.S Hegde Charitable Hospital. Mangaluru. The essential data for the study was collected from patient case files using a well-designed patient data collection form. The study included a series analysis of patients with COPD who met with the inclusion criteria. The data of patients who met the inclusion criteria was collected to study the prescribing patterns. From each of the out-patient record, the relevant data on drug prescription of the patient was collected. The demographic data (age, gender), the diagnosis by the treating physician was obtained from the case records of each patient. In addition, from the medical records, associated comorbid conditions, risk factors identified for developing Chronic Obstructive Pulmonary Disease was noted. The study was approved by Institutional Human Ethics Committee, NGSMIPS, Mangaluru [REF: NGSMIPS/IEC/23/2017-18]. Descriptive statistics such as frequency, percentage, mean and standard deviation was applied for analysing the collected data. Data analysis was carried out using statistical analysis package for social sciences (SPSS) 20.0 for windows.

RESULTS:

Demographic Characteristics of the Study Population.

During the study period, a total of 150 patients of either sex were evaluated. In the 150 patients evaluated, it was found that the occurrence of COPD was predominantly higher in males (75.3%) than that in females (24. 6%).Gender wise distribution of the patients diagnosed with COPD are summarized in Table 1.

Table 1: Gender wise distribution of the patients

Gender	Total number of patients (n = 150)	Percentage
Male	113	75.3%
Female	37	24.6%

In the study, patients were grouped into different age groups with an interval of 10 years. The incidence of COPD was found to be highest in the age group of 6170 years (44%), and the least in the age groups below 40 years of age (1.4%). The detailed age wise distribution of the patients is summarised in table 2:

Table 2: Age wise distribution of COPD patients

Age group	No. of patients (n = 150)	Male	Female	Percentage
21-30	0	0	0	0
31-40	0	0	0	0
41-50	6	5	1	4%
51-60	42	36	6	28%
61-70	66	48	18	44.0%
71-80	31	21	10	20.7%
81-90	5	4	1	3.3%

Smoking status of COPD patients

Among the 150 patients evaluated, it was found that 93 (62%) patients were smokers and 21(38%) were non-smokers. Smokers were further classified into 38.7% of current smokers and 23.3% of ex-smokers. The details of smoking status in the evaluated patients have been summarised in table 3.

Table 3: Smoking status among COPD patients

Smoking status	No. of patients (n = 150)	Male	Female	Percentage
Current Smokers	58	57	1	38.7%
Ex-smokers	35	35	0	23.3%
Non smokers	57	21	36	38%

Drugs used in the management of COPD.

The study revealed that the most prescribed drug for the management of COPD was theophylline (78.6%), followed by Formoterol (47.3%) and budesonide (40.6%). Tiotropium was prescribed in 28.6% of the patients, levosalbutamol in 21.3%, ipratropium in 19.3%, salbutamol in 12% and doxophylline in 11.3% of patients. The least prescribed drugs were beclomethasone and hydrocortisone, which was in 4.6%of patients. In the class of antibiotics, amoxicillin + clavulanic acid was the most preferred and cefixime was the least. Expectorants and mucolytic were also used in managing COPD. The detailed report of drugs used is summarised in table 4.

Table 4: Drugs used in the treatment of COPD

Drug class	Drug	No of patients	Percentage
Beta -2- Agonist	Salbutamol	18	12%
	Levosalbutamol	32	21.3%
	Salmetrol	8	5.3%
	Formoterol	71	47.3%
Anticholinergics	Ipratropium	29	19.3%
	Tiotropium	43	28.6%
Methylxanthines	Theophylline	118	78.6%
	Doxophylline	17	11.3%
Corticosteroids	Budesonide	61	40.6%
	Beclomethasone	07	4.6%
	Hydrocortisone	07	4.6%
	Fluticasone	13	8.6%
	Amoxicillin	22	14.6%

Antibiotics	Ceftriaxone	13	8.6%
	Cefpodoxime	09	6%
	Cefixime	03	2%
	Azithromycin	14	9.3%
	Levofloxacin	05	3.3%
	Moxifloxacin	07	4.6%
Mucolytics	Acetylcysteine	17	11.3%
Expectorants	Guaifenesin	53	35.3%

Percentage of antibiotics used in COPD

Exacerbation of COPD was treated with antibiotics of which cephalosporin antibiotic was prescribed in 16.7% patients, penicillin in 14.6% patients and macrolides in 9.3% patients and fluroquinolones in 8% patients.

Table 5: Percentage of antibiotics used in COPD

Antibiotic class	No. of patients	Percentage
Penicillin	22	30.13%
Cephalosporin	25	34.2%
Macrolides	14	19.17%
Fluoroquinolones	12	16.43%

Drugs used in combination

Most of the patients were prescribed with combination of Formoterol + Budesonide (40%) followed by Formoterol + Tiotropium (26%). The least prescribed combination was Salbutamol + Beclomethasone (2.6%). The detailed report of the drugs used in combination is summarised in table 6.

Table 6: Drugs used in combination

Drug combination	Drugs	No of patients	Percentage
SABA+ SAMA	Salbutamol + ipratropium	29	19.3%
LABA + LAMA	Formoterol + Tiotropium	39	26%
Bronchodilator +	Salmeterol + fluticasone	8	5.3%

Corticosteroids	Formoterol + Budesonide	60	40%
	Salbutamol + Beclomethasone	4	2.6%
	Formoterol + fluticasone	6	4%
	Formoterol + Beclomethasone	5	3.33%

DISCUSSION:

COPD is an escalating problem globally with the WHO estimates for 2030 predicting it to be the third leading cause of death worldwide. This increase in COPD associated morbidity and mortality is related to the increase in tobacco use and the exposure to smoke from the combustion or burning of solid fuels or biomass fuels indoors for cooking or heating. COPD, although being highly prevalent it is underdiagnosed and then during the time of diagnosis, patients are found to be left with declined lung functions. Early identification and diagnosis of the disease is essential as the lung functioning levels are associated with the increased morbidity and mortality[1].

The current study evaluated the signs and symptoms which were common in the patients during their hospital visits. The complaints on admission included dyspnoea in 132 (88%), cough with expectoration in 109 (72.7%), wheezing in14 (27.3%) and chest pain in 11(7.3%) of patients.

In the current study conducted in 150 patients it was found that the prevalence of COPD was higher in males (75.3%) as compared to the females (24.6%). This result is similar to that obtained in the studies conducted in 2015 by Unni A.al in 237 patients, in which 75.2% males and 24.5% females were affected. The study conducted in 2016 by Vikineshwari et al in 250 patients also shows that COPD was found to be predominantly higher in males (72.2%) compared to females (24.8%). This increase in prevalence of COPD in males can be related to the increase in tobacco or smoking habits among male gender from adolescence, a result which was found in this study [6,7].

A total of 150 patients were evaluated in this study and it was found that the most age group with least number of patients was in the age group of 21-40 years of age. These results are consistent with the one obtained in 2015 by Gigi A. et al which showed that prevalence of COPD was highest in age groups of 61-70 years (35%). The study conducted by Adil M S et al also shows similar results with the mean age groups found to be 61.29%. But these results obtained were in contradiction to the results obtained by Kothai R et al which showed that the most common age group was between 41-50years. This contradiction could be due to the large number of patients evaluated for the study and also due to the socioeconomic status of the patients visiting the hospital. The other possible reason could be either due to absence of

symptoms or presence of mild symptoms such as nagging cough, mild wheezing, etc. during the initial stages of the disease, which then makes the early identification and detection difficult [8,9,10].

The study results show that out of the 150 patients evaluated, 62% were found to be smokers and 38% were non-smokers. 38.7% of current smokers and 23.3% of exsmokers constitute the smokers' category. These results are in par with those obtained by Sawant M P et al which also showed the percentage of current smokers to be 35% and that of ex-smokers to be 24%. Smoking as a major risk factor was supported by all the previous studies. Initiation of smoking from a younger age causes abnormal development of lungs there by causing a considerable decline in lung function at the time of development of COPD [11].

The current study conducted revealed that the most prescribed class of drug was methylxanthines (89.9%) of which theophylline was prescribed in 78.6% patients. Although this result was supported by the study conducted by Veetil S K et al, owing to the larger sample size of the study, the percentage use of theophylline was much higher (96%) in the study. The other drugs prescribed in the management of COPD were beta-2-agonists in 85.9% of patients, corticosteroids in 58.4%, antibiotics in 48.4% and anticholinergics in 47.9% [12].

Antibiotics are used in the management of exacerbation of COPD which is usually caused by pathogens such as Streptococcus pneumonia, H influenza, Moraxella catarrhalis etc. which may be also due to long term steroid use. In the current study the antibiotics were prescribed only in 73 patients. Among the antibiotics prescribed, 34% was cephalosporin antibiotic which was also the most common antibiotic. This was also followed by 30% Penicillin and the least used antibiotic class was fluoroquinolones (16.43%). Similar results were found in a study conducted by Shrestha R et al, which revealed that the most prescribed antibiotic was cephalosporin. However, a study conducted by Adil M S which showed contradictory result that penicillin was the most prescribed drug [13,10].

This study shows that the drugs which are prescribed the most in combination therapy was Formoterol + Budesonide. 60(40%) patients were prescribed with this combination. This result is in contradiction to a study conducted by Gigi et at in 2015 and Unni A et al both of which shows that the most preferred combination therapy was that of salbutamol + ipratropium. This may be due to the increased efficacy of long acting bronchodialator + corticosteroid combination [9,14].

CONCLUSION:

In this study, it was found that men were predominantly diagnosed with COPD than women i.e. 75.3% were males and 24.6% were females which imply that men were having higher incidence of suffering from COPD than women possibly because of the increased trend of smoking in men. COPD was more commonly found in patients with 40 years of age and above and the most common age group was found to be 61-70 years. This shows that as the age increases, the chances of suffering from COPD also increases. The most common symptom that was shown by the patients were dyspnoea in 88% and cough with expectoration in 72%. As similar to other studies, in this study also it was found that smokers which included current smokers and ex-smokers outnumbered non-smokers which imply that smoking is a major risk factor for COPD. Though biomass fuel smoke, outdoor air pollution, passive smoking

contributes to COPD, in this study active smoking, male gender and increasing age were found to be major risk factors for COPD.

In this study, antibiotics were prescribed for acute exacerbation of COPD which is usually prescribed in moderate to severe COPD. In COPD patients, exacerbations are caused by most probably S. Pneumonia and H. Influenza which can be treated by using doxycycline, trimethoprim-sulfamethoxazole or Cephalosporins. In this study, the most commonly prescribed antibiotic class were Cephalosporins which is an appropriate treatment for exacerbations of COPD in out-patients. In this study, both monotherapy and combination therapy of COPD were given to patients. Combination therapy was found to be more effective than prescribing a drug alone. The most prescribed individual drug in this study was Theophylline which is the maintenance therapy given for majority of patients followed by combination therapy which includes Formoterol + Budesonide and Formoterol + Tiotropium, administered as inhalers. Treatment with long acting bronchodilators was preferred over methylxanthines as per GOLD recommendations.

CONFLICT OF INTEREST:

The authors declare no conflict of interest.

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