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Original Research Paper

Medicine

PRESCRIBING PATTERN OF DRUGS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE IN TERTIARY CARE TEACHING HOSPITAL

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ABSTRACT

Background: Chronic obstructive pulmonary disease (COPD) is a serious public health concern in the twenty-first century, and its incidence, morbidity, and death rates have posed a challenge to the healthcare system. Cigarette smoking and occupational exposure are the two main causes of COPD. So, in this retrospective study, an attempt was made to compare the present prescribing pattern in a tertiary care facility in Nagapattinam to WHO prescribing indicators to check if the prescription pattern followed WHO standards. **Materials And Methods:** During the six months from April to September 2021, a retrospective study was conducted using case files from 80 subjects in the department of General Medicine. The following socio-demographic data, social history, comorbid conditions, route of administration, smoking history, and distribution of prescribed COPD treatments were collected. **Results:** The age group of 61–70 years had the highest proportion of patients (37.5%), followed by 51–60 years (23.7%), 71–80 years (16.25%), 41–50 years (11%), and 31–40 years (10%), and the age group of 20–30 years had the lowest rate (1.20%). In a study of 80 subjects prescription, smoking history was found in 66.25 % of men and 2.5% of women. Comorbidities affect 71.25% of people, while the percentage of people who do not have comorbidities is 28.7%. A total of 619 medicines were prescribed in the 80 prescriptions. Bronchodilators (36.1%) were the most commonly given classes of medications, followed by antibiotics (25.8%), corticosteroids (18.7%). Leukotriene antagonists were the least commonly prescribed medication class (0.80%). **Conclusion:** Utilizing the WHO's core prescribing indicators for this COPD patients will strengthen the current hospital prescribing policies Clinical Pharmacists as drug therapy managers can play an excellent role in optimizing the drug therapy regimens supporting other health care professionals.

KEYWORDS : cigarette smoking, comorbidities, classes of medications, clinical pharmacist

INTRODUCTION

Chronic Obstructive Pulmonary Disease (COPD) is a serious public health issue in the twenty-first century. COPD has a high prevalence, morbidity, and mortality rate worldwide, which has posed a challenge to the healthcare system. When comparing both sexes around the age of 35 years in India, males were affected more than females, indicating that the prevalence rate of COPD is higher in males than females. Smoking is the primary cause of COPD and other lung diseases, whether a person smokes regularly or only sometimes. COPD is defined by the World Health Organization (WHO) as a common, chronic lung illness that may be avoided and managed. It is characterized by constriction of the tiny airways of the lungs, resulting in obstructed airflow. The production of mucus within the airways, the smooth lining of the bronchioles being irritated and swollen owing to continuous exposure to irritants, and a portion of the lung becoming destroyed may all contribute to the blockage.

According to the CDC's Morbidity and Mortality Weekly Report (MMWR), the rate of people diagnosed with COPD in rural areas is roughly double that of urban areas. Chronic respiratory diseases (CRDs) are a prominent cause of illness burden both globally and in India. Obstructive lung disease affects around 100 million people worldwide. India is a huge country with a wide range of geographical, environmental, economic, ethnic, religious, and sociopolitical diversity. These factors may have an impact on the incidence, prevalence, and management of chronic diseases. Cigarette smoking and occupational exposure are the leading causes of COPD. The extended latency time between being exposed to smoking and developing COPD-related problems or co-morbidities contributes to the rising COPD death rate. Chronic exposure to gases from air pollution or indoor solid fuel combustion may also be a factor in the rising prevalence, morbidity, and death rates of chronic obstructive pulmonary disease in low-income populations. Prescription pattern monitoring studies (PPMS) are a type of medication usage research that uses technology to track prescription patterns, focuses mostly on medication prescription and administration. They encourage drug usage that is acceptable, reasonable, and reduces the abuse or misuse of monitored substances. Ineffective and hazardous therapy, worsening or duration of illness, patient suffering and injury, and increased expenses are all consequences of poor prescription behavior. Because of an increase in new medication marketing, differences in prescribing and consumption patterns, increased concern about delayed side effects, drug cost, and prescription volume, PPMS is becoming more important.

In general, a long-acting muscarinic antagonist (LAMA), a long-acting 2 agonist (LABA), or a combination of the two (LABA/LAMA), can be used to treat both dyspnea and exacerbations. Patients who have more frequent exacerbations may benefit from the use of long-acting 2 agonists with inhaled corticosteroids (LABA/ICS). Furthermore, incorrect medication administration can result in serious side effects that endanger the patient. As a result, we attempted to assess the medication prescribing pattern in the therapy of chronic obstructive pulmonary disease at Indian tertiary care teaching hospital in this study. The major causes of COPD in Nagapattinam are a lack of public knowledge of the disease, occupational exposure, smoking, and illogical medication usage, which is a global concern currently. The majority of our research focuses on COPD medicine prescription trends. Various mistakes may be made while prescribing, such as using too much or too little. Prescription mistakes include overuse or underuse of oxygen treatment, fear of administering oral steroids, and overuse of antibiotics

to treat COPD exacerbations, to name a few. So, in this study, an attempt was made to compare the existing prescribing pattern in a tertiary care hospital in Nagapattinam to WHO prescribing indicators to check if the prescription pattern followed WHO criteria.

MATERIALS AND METHODS

Study Design And Setting

For prescription pattern monitoring research, a pre-determined case record form was utilized to gather data from 80 individuals in the department of General Medicine for six months from April to September 2021 in the Government district headquarters hospital, Nagapattinam, Tamil Nadu. The following socio-demographic data, social history, comorbid conditions, route of administration, smoking history, and distribution of prescribed COPD treatments, as well as other pertinent details of the study subjects, were collected from patient case sheets and treatment charts available at the hospital archival, according to a described retrospective analysis. Drugs are divided into many classes based on their pharmacological effects. By comparing the rational use of prescriptions to WHO core prescribing indicators, the rational use of prescriptions was determined. This information was examined using Microsoft Excel, and the findings were expressed as percentages. Prescriptions were examined to determine prescription patterns among COPD patients.

RESULTS

In our retrospective observational research, 80 prescriptions were gathered and analyzed for a prescription pattern that included 619 medications in COPD patients. Gender, age, social background, and concomitant conditions were used to characterize these individuals.

Table 1: Socio-demographic Data

GENDER DISTRIBUTON		
MALE		- 90
FEMALE		- 10
AGE GROUP	(mean age : 65.4)	
20-30		- 1.2
31-40		- 10
41-50		- 11
51-60		- 23.7
61-70		- 37.5
71-80		- 16.25
SMOKING HISTORY		
Smokers(men)		- 66.25%
Smokers (womens)		- 2.50%
Ex-smokers		- 12%
Non-smokers		- 19%
MULTIPLE CO-MORBIDITIES		
Hypertension + diabetes mellitus		- (30%)
Old pulmonary tuberculosis + pneumonia		- (18.7%)
Diabetes mellitus + hypertension + Cardiovasclar diseases +old PTB		- (12.5%)
Corpulmunalae with hypertension		- (6.25%)

TABLE 1 in our analysis showed that COPD occurs more in men than in women. out of 80 subjects 71.25% have co-morbidities and without comorbidity is 28.7%, frequently occurring comorbidity was hypertension (72.5%) followed by cardiovascular disease (61.2%) and type2 diabetesmellitus (55%), pneumonia (41%), old pulmonary tuberculosis (30%), chronic kidney disease (20%), asthma (17.5%), bronchial asthma (15%), corpumunalae (13.7%), hypothyroidism (3.7%).

Table 2: Different Classes Of Drugs Prescribed For The Management Of COPD (N=619)

Class of drugs	Frequency %
Bronchodilators	224(36.1)
Antibiotics	160(25.8)
Corticosteroids	116(18.7)
Antihistamines	66(10.6)
Oxygen inhalation	31(5)
Mucolytics	17(2.7)
Leukotriene antagonist	5(0.80)
TOTAL	619(100)

Table 2 represents the pattern of drugs prescribed in the management of COPD. Among the 80 prescriptions, a total of 619 drugs were prescribed for the management of COPD. Among them, bronchodilators (36.1%) were the most prescribed class of drugs, followed by corticosteroids (25.8%) and antibiotics (18.73%), oxygen inhalation(5%), mucolytics (2.7%), leukotriene antagonists (0.80%). were the least prescribed class of drugs.

FIG 1 illustrates Deriphylline was most frequently prescribed among bronchodilators ie, 41.5%, followed by salbutamol 41%, and ipratropium bromide 5.8% was the least prescribed bronchodilators.

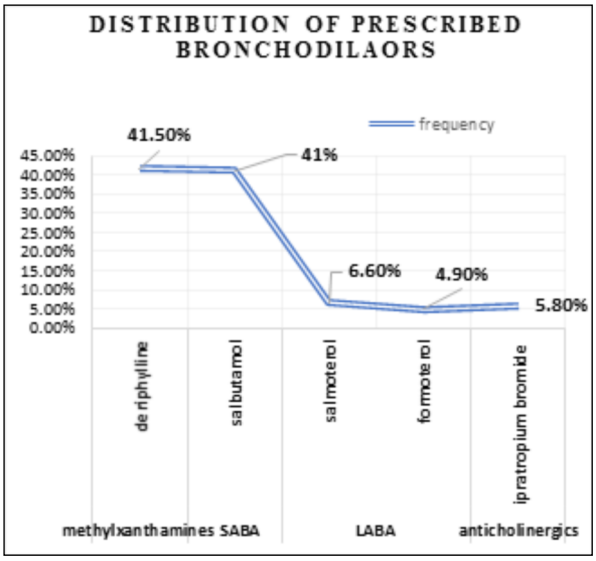

Fig 1: Distribution Of Prescribed Bronchodilators

FIG 2 depicts that the combination therapy in study subjects, theophylline + theophylline was mostly given (26.2%) followed by salbutamol+ ipratropium + budesonide (25%), Salbutamol + budesonide (19%), salbutamol + ipratropium(11%), ipratropium +budesonide (10%) ,formoterol+ ipratropium (5%) and the least prescribed was salmeterol + fluticasone (3.75%).

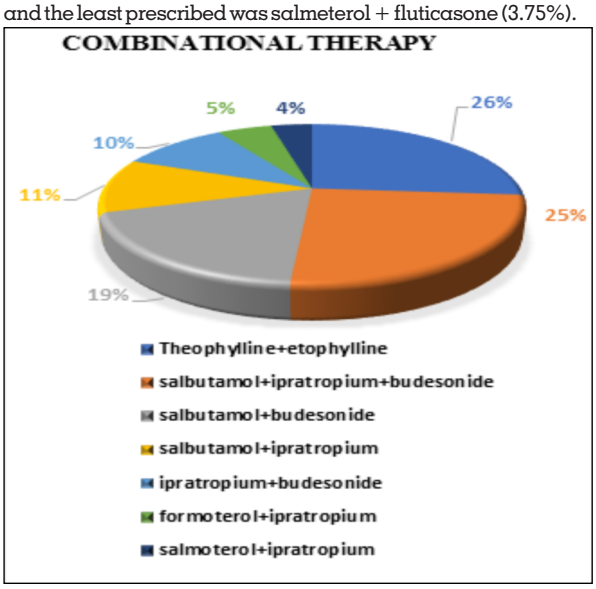

Fig 2: Combinational Therapy

In our analysis, β- lactam antibiotics were mostly prescribed including cefotaxime 36.20% followed by Azithromycin was

the second most prescribed antibiotic in the present study 25.80 %, ceftriaxone 24.10%, amoxicillin 10.30%, ciprofloxacin 2.50%. From our findings, the distribution of corticosteroids, with inhaled corticosteroids, such as budesonide (28.7 %), being the most commonly administered, followed by fluticasone (21.08%) while systemic corticosteroids, such as hydrocortisone (25.6%), followed by prednisolone (6.8%), methylprednisolone (3.10%), dexamethasone (13.7%). Route of administration of drugs, the oral route of administration was mostly used [249 (44.9%)], followed by the parenteral route [203(36.6%)], inhalation route [102(21.6%)]. Our analysis also shows that 98 nebulizations were prescribed, with salbutamol nebulizer (54.7 %) being the most commonly used, followed by levosalbtamol + ipratropium (18.9%), and formoterol+budesonide (4.2%) being the least commonly used.

FIG 3 illustrates details of concomitant drugs prescribed. H2 receptor blocker (17.60%) was highly prescribed drugs followed by anti-hypertensive drugs (11.9%), Antidiabetic drugs (11.10 %), Anti-platelet drugs (10%), NSAIDS (9.50%), Diuretics (8.60%), Beta blockers(7%), Proton pump inhibitor(5.90%), Hypolipidemics (5.10%), Anti-arrythmics (4.30%), Multivitamin (3.50%), Nitrares (2.70%)and the least prescribed was Probiotics (2.10%).

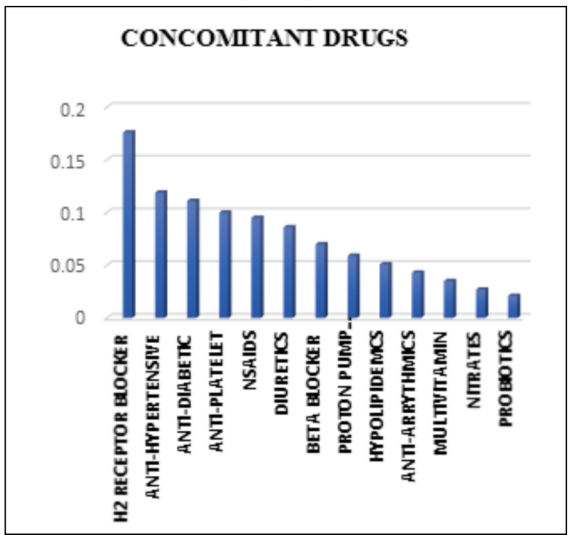

FIG 3: Concomitant Drugs

Table 4 represents that the average number of drugs per prescription or mean was (7 %)with a range between 7-9 drugs each in 80 prescriptions which conclude that polypharmacy was present and most of the drugs were prescribed by generic name (98.7%) and only 1.3% were prescribed by their brand name which is nearby WHO reference value100%. Antibiotics were prescribed 43.75% which was above WHO norms (20.0-26.8%.), Injection use was 25.3 % which meets the WHO criteria Prescription of drugs from EDL (86.9%) which is lower than the standard derived (100%).

Table 4: Who Core Prescribing Indicator

SI. NO	INDICATORS	OBSERVED VALUE	WHO REFERENCE VALUE
1.	The average number of drugs per counter	7%	1.6-1.8
2.	Percentage of drugs prescribed by generic name	98.7%	100%
3.	Percentage of encounters with an antibiotic prescribed	43.75%	20.0-26.8%
4.	Percentage of encounters with an injection prescribed	25.3%	13.4-24.1%
5.	Percentage of drugs from the essential medicine list or formulary	86.9%	80-100%

DISCUSSIONS

The present retrospective observational study was undertaken to determine the prescribing pattern of COPD in the General Medicine Department in the Government district headquarters hospital, Nagapattinam. The objective of the study was to determine the prescribing pattern of COPD concerning WHO indicators. Chronic obstructive pulmonary disease (COPD) is a slowly progressive disease and its symptoms usually develop late over the years; COPD can affect any age group but it was most commonly seen affecting the middle-aged and elderly population and it intensifies gradually after several years. Morbidity and mortality in COPD can be reduced with early diagnosis and initiation of treatment. So our analysis showed that COPD occurs more in men than in women but these findings are by studies done by Dr.v.prathibha et.al, around 93% of the population was male gender which shows the high prevalence & risk of COPD in males. Among those prescriptions, age was taken into consideration by dividing into 6 age groups being kept at an interval of 10 years each. Parbiaz AK and Lopez AD, et.al this study also showed that the prevalence of COPD was more in the age group 60-70 years with 53%.In our study, among 80 subjects, 55 (69%) were smokers, 15(19%) were non-smokers and 10(12%) were ex-smokers. however, some women from rural backgrounds still smoke, which contributed to the subgroup of female smokers in our study. In smokers, these cells release pro-inflammatory mediators as a complex network of inflammation comprising various inflammatory cells and mediators can lead to damage to the pulmonary architecture. In our study, 71.25% of patients have co-morbidities and without comorbidity is 28.7%, Hypertension (72.5%) followed by cardiovascular disease (61.2%), was frequently seen in COPD patients and it's the most common comorbid condition among our study subjects. Sex, age, lifestyle choices, race, or ethnicity may also contribute to hypertension. Our study depicts, COPD is often associated with several other comorbidities, mainly affecting the cardiovascular system. Framingham Study had shown that smoking could increase the impact of hypertension as a risk factor in the development of cardiovascular diseases. Among the 80 patients, diabetes mellitus +hypertension (30%) followed by old pulmonary tuberculosis + pneumonia (18%) was more common in subjects with COPD and it is associated with high levels of polypharmacy. Hypertension was frequently seen in COPD patients because of loss of alveolar remodeling of the pulmonary vessels by chronic hypoxia and inflammation, which decreases the levels of endothelial vasodilators such as nitric oxide and vasospasm caused by factors such as endothelin-1(ET-1) levels. Among the COPD class of drugs, bronchodilators were mostly prescribed (36.1%)which was supported by the results of the previous study conducted by Singh S.et .al.Bronchodilators are central to the treatment of COPD because they alleviate bronchial constriction and airflow limitation which reduce hyperinflation and improve the emptying of the lung and exercise performance.

Among the bronchodilators, short-acting β-agonists were the main bide in the therapy as outlined by GOLD guidelines. Most commonly used bronchodilators were deriphylline (theophylline + etophylline) (41.5%) followed by salbutamol (41%). Methylxanthines cause smooth muscle relaxation and improve breathing by increasing the strength of the diaphragm, they may also influence the course of exacerbations of COPD through actions to decrease diaphragmatic muscle fatigue, increase mucociliary hypoventilation and decrease capillary leakages. Our study showed that β- lactam antibiotics were mostly prescribed including cefotaxime 36.2% and Azithromycin (25.8%) was the second most prescribed antibiotic, these findings are by GOLD guidelines according to which antibiotics may be required in the management of infective exacerbation COPD who have increased incidence dyspnea, sputum volume, and sputum purulent discharge.

Inhaled Steroid, budesonide, was prescribed to 28.7% of

subjects followed by fluticasone 21.8%, which was by GOLD guidelines, and the results are similar to previous studies results of by Veettil S et al and Unni A et al. The appropriate use of inhalation devices and adherence to prescribed therapy were the key aspects in achieving better clinical control and improved quality of life, incorrect inhaler technique is associated with a 50% increased risk of hospitalization, increased emergency department visits and increased use of oral corticosteroids.

In our study nebulization prescribed was to 98 subjects, among them, salbutamol nebulizer (54.7%) was the most commonly prescribed. Nebulizers are used in emergency settings for acute treatment of patients or chronic disease management for children or elderly patients who are unable to use the inhalers. Once operational, nebulizers are easy to use and offer a convenient way of delivering a higher dose of treatment to the airways If required.

Combination therapies have a greater impact compared to monotherapy, it also reduces the risk of death or hospitalization. From our findings, using the WHO core prescribing indicators, the average number of drugs prescribed per counter varies more than that of the WHO reference value, because our subjects are having comorbidities along with COPD, so ordinally our values deviated from the WHO stated values. Therefore, the percentage of drugs prescribed by generic name was only 98.7%, as per WHO recommendations maximum drugs should be prescribed with by generic name, which may decrease the cost to the patient and will able to help to increase passivity. The vast variation in the prescription pattern of generic drugs is mainly because the doctor preferred to prescribe branded medicines. In the present study, 525 drugs were prescribed from the essential drug list, which contributes to 84.8% of essential drug use. There was a variation in the studies regarding the prescription of drugs as per the essential drug list According to WHO guidelines 80-100 % of drugs should be prescribed from the EDL.

Limitations Of This Study

Although all efforts have been made to make the study explanatory, it still goes with the limitations of having a relatively smaller sample size (80 prescriptions) and a short duration of the study (6 months). There is a need to conduct other such studies in multiple centers and with larger sample sizes and for a longer duration to get a broader and comprehensive idea of the prescription pattern of drugs.

CONCLUSIONS

This study concluded that Male preponderance compared to females and the majority of the drugs prescribed by the global initiative for chronic obstructive lung disease (GOLD) guidelines. Couldn't be avoided polypharmacy in the case of COPD patients with multiple comorbidities. Combinational therapy was favored over monotherapy. Bronchodilators appeared the most prescribed class of drugs among COPD drugs Polypharmacy generally paved the way for the high incidence of drug interactions and other inauspicious effects. Utilizing the WHO's core prescribing indicators for this COPD patients will strengthen the current hospital prescribing policies and improves the prescription pattern of drugs, saving precious life years and monetary resources. Owing to the paucity of these studies in outpatient settings, Clinical Pharmacists as drug therapy managers can play an excellent role in optimizing the drug therapy regimens by supporting other health care professionals.

Abbreviations

COPD: Chronic Obstructive Pulmonary Disease.
WHO: World Health Organization
EDL: Essential Drug List
GOLD: Global Initiative For Chronic Obstructive Lung Disease.
PPMS: Prescription Pattern Monitoring Studies.
SABA: Short-Acting Beta 2 Agonist,
LABA: Long-Acting Beta 2 Agonist

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