Original Article

A Study on Prescription Pattern and Assessment of Smoking as a Risk Factor among COPD Patients in a Tertiary Care Hospital

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ABSTRACT

Aim: The aim is to study the prescription pattern and to assess whether smoking is a major risk factor among COPD patients in a tertiary care hospital. **Materials and Methods:** A prospective observational study was conducted for 6 months. All the data were collected, documented and analysed based on standard protocol. Data collected were entered and statistically analysed using Microsoft Excel. **Results:** 120 patients (83 male and 37 female) were included in the study. COPD was more common in the age group of 61-70 years with an average age of 66.8 years. Hypertension ((38.33%) was the most common comorbidity followed by diabetes mellitus. Smoking (66.6%) was a major risk factor followed by indoor pollution (16.60%) outdoor pollution, family history and asthma respectively. Among smokers, 61.25% were ex-smokers. 46.25% of smoking patients had pack years of 11-20. Most commonly prescribed drugs were Bronchodilators (98.30%), antibiotics (85.80%) and corticosteroids (70%). Deriphylline was the most commonly prescribed bronchodilator. Beta lactam antibiotics were most commonly prescribed antibiotics. Among other drugs, GI drugs were commonly prescribed. Parenteral route was mostly preferred, followed by inhalation and oral respectively. **Conclusion:** The study provides insight into the prescription pattern and shows that smoking is a major risk factor among COPD patients. In this study, bronchodilators were the most commonly used drug followed by antibiotics and corticosteroids. Smoking is a major risk factor followed by indoor pollution, outdoor pollution, family history and asthma respectively.

Keywords: Chronic obstructive pulmonary disease, Comorbidities, Prescription pattern, Smoking, Risk factors.

INTRODUCTION

Chronic Obstructive pulmonary disease has become the most common public health concern and it is a preventable and treatable chronic lung disease which affect both men and women COPD is a common lung disease characterized by chronic obstruction of lung that interfere with the normal airflow in bronchioles which is partially reversible.[1] COPD caused 3.32 million deaths in 2019 and it is considered as the third leading cause of death worldwide. The incidence rate of COPD is higher in case of males and smokers when compared to females and non-smokers. Tobacco smoking is considered as the main cause of COPD in developed countries. In addition to it the other risk factors like poor nutrition status, chronic asthma, impaired lung growth, air pollution, genetic factors, poor socioeconomic status, occupational exposure to pollutants are also responsible for the development of COPD in a population. The process of peripheral airway inflammation and narrowing of airway in the combined form leads to COPD. Both this combined process leads to the destruction and loss of alveoli, terminal bronchioles and neighbouring capillary vessels and tissues. This may cause airflow limitation which is determined by the severity

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of inflammation and this leads to the decreased gas transfer capacity. The reduced airflow on exhalation leads to air trapping resulting in the reduced inspiratory capacity which may lead to breathlessness. Pack year calculation is a clinical quantification of cigarette smoking which describes a person's exposure to tobacco. It is calculated by multiplying the number of packs of cigarettes smoked per day by the total years the person has smoked. The major comorbidities that have been seen in COPD patients include hypertension, diabetes mellitus, stroke, osteoporosis, lung cancer. Physicians will diagnose COPD based on the signs and symptoms, family history, spirometry, chest x-ray, Computerized Tomography scan, Arterial blood gas analysis. The commonly prescribed drug for treatment of COPD is bronchodilators which include short acting bronchodilators for the patients who need immediate relief from the symptoms and long acting bronchodilators are used for long term maintenance management of patients with moderate to severe disease. The other drugs may include inhaled beta agonist, inhaled anticholinergic, oxygen therapy, antibiotic and systemic corticosteroids. To optimize the management of COPD, prescription patterns should be studied and assessment of whether smoking is a major risk factor will help in prevention of COPD in future.

MATERIALS AND METHODS

Study site: Study was conducted at the inpatient Department of pulmonology in a tertiary care hospital, Kannur.

Study design: Prospective observational study

Study material: Patient medication profile, Drug treatment chart

Inclusion criteria

- Patients of age groups greater than 18 years of either sex admitted to the pulmonology department for treatment of COPD.
- Patients with or without comorbidities.

Exclusion criteria

- Lactating and pregnant women.
- Patients who are not willing to participate.

Study procedure: Detailed information regarding the study was given to the patient. Informed consent of the patient was obtained. Data collection form was created. All the information of patient like age, sex, medical history, admission complaints, diagnosis, occupational status, risk factors, social history, family history, treatment charts were collected from patient medication profile and documented. Patient's name was excluded from the case report to protect the confidentiality of the patient.

Ethics and consent: The study was approved by the Institutional Human Ethical Committee of Crescent College of Pharmaceutical Sciences filed under 001/2021/CCOPS/IEC. Permission to conduct the study was obtained from the chairperson of the institutional human ethics committee.

RESULTS

A prospective observational study was conducted for 6 months in the pulmonology department of a tertiary care hospital, Kannur. A total of 120 patients meeting the inclusion criteria were included in the study.

Gender wise distribution of COPD

Out of 120 patients, 83 (69.16%) patients were male and 37 (30.83%) patients were female. Thus in our study, COPD was more common among males than females.

Age-wise distribution

The age group of the sample population was found to be in between 21-90 years. The average age of the patients included in the study was found to be 66.84 years. Out of 120 patients, the majority of patients belong to the 61-70 years age group (37.5%). (Figure 1).

Risk factors of COPD

Among 120 patients, smoking was found in 66.66%, indoor pollution was found in 16.66%, outdoor pollution was found in 10%, family history was found in 9.16%, asthma was found in 3.33% and risk factor was unknown in 1.6%. (Table 1).

Distribution of comorbidities among COPD patients

A total of 176 comorbidities were reported in 120 patients. And the comorbidities reported by the sample were Hypertension (38.33%), Diabetes Mellitus (30%), CAD(25.83%), COVID-19 (7.5%), Respiratory failure (6.6%), Stroke(5.83%), Dyslipidemia (5%), CKD (5%), Hyponatremia (4.16%), Asthma (3.33%), tumor (2.5%), seizure (2.5%), Tuberculosis (2.5%), psychiatric diseases (2.5%), Rheumatoid Arthritis (1.6%), Ulcerative Colitis (0.83%) and other comorbidities (2.5%). Other

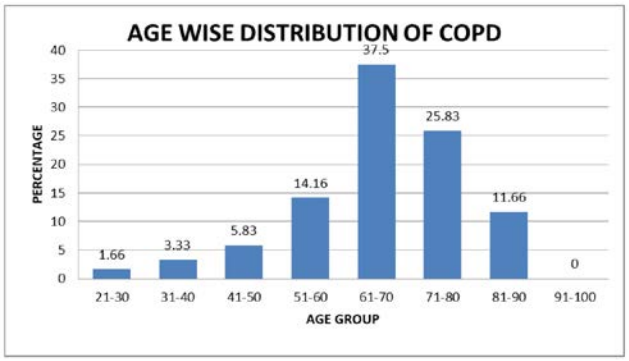

Figure 1: Age wise distribution of COPD.

Table 1: Distribution of risk factors among COPD patients.

Risk factors	Number of patients (n=120)	Percentage
Smoking	80	66.66%
Asthma	4	3.33%
Indoor pollutants	20	16.6%
Outdoor pollutions	12	10%
Family history	11	9.16%
Unknown	2	1.6%

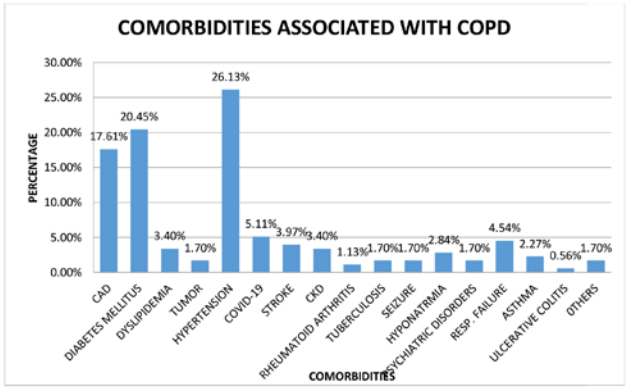

Figure 2: Distribution of comorbidities among COPD patients.

comorbidities include Urinary Tract Infection, Metabolic encephalopathy and gout. Hypertension was the most common comorbidity among the study participants. (Figure 2).

Distribution of smoking status among smoking COPD patients

Among 80 smokers, 49 (61.25%) patients are ex-smokers and 31 (38.75%) patients are current smokers. Thus, in this study ex-smokers are more than current smokers. (Figure 3).

Pack years of smoking in COPD patients

Among 80 COPD patients with smoking habits, 37 (46.25%) patients had 11-20 pack years, 23 (28.75%) patients had 21-30 pack years, 10 (12.5%) patients had 31-40 pack years, 8 (10%) patients had 0-10 pack years, 2 (2.5%) patients had 41-50 pack years. Therefore, in this study most of the patients had pack years of 11-20. (Figure 4).

Prescribing pattern of drugs among COPD patients

A total of 971 drugs were prescribed for 120 patients. Among 971 drugs, 621 (63.95%) drugs were used for the treatment of COPD and 350 (36.04%) drugs were not specific for COPD and are used to treat other comorbidities and conditions.

Prescribing pattern of COPD drugs

Among 621 COPD drugs, 293 (47.18%) drugs were bronchodilators, 127 (20.45%) drugs were antibiotics, 118 (19.06%) drugs were corticosteroids,28 (4.5%) drugs were Bronchodilators + corticosteroids, 24 (3.8%)drugs were O2, 12 (1.93%) were mucolytics, 12 (1.93%) were LTRA + Antihistamines, 6 (0.96%) drugs were bronchodilators

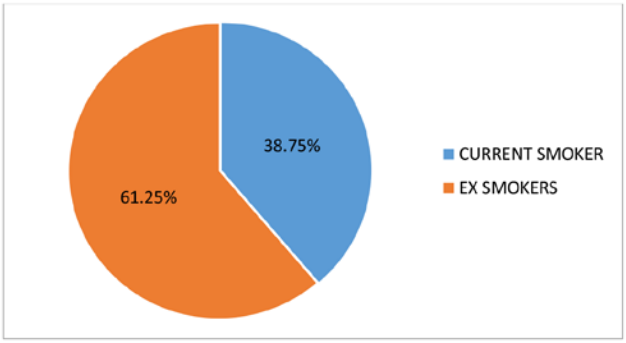

Figure 3: Distribution of smoking status among smoking COPD patients.

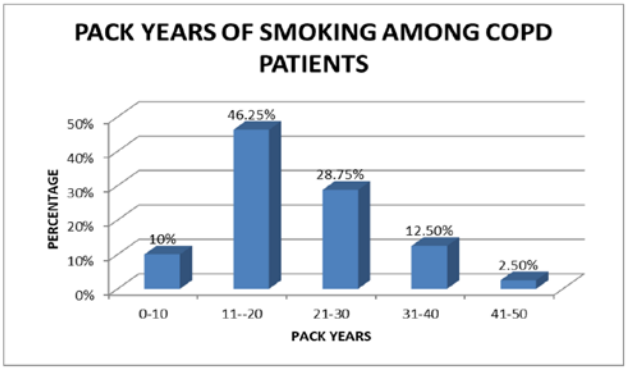

Figure 4: Pack years of smoking among COPD patients.

+ mucolytics and 1 (0.16%) was LTRA. So, in this study bronchodilators were most commonly prescribed drugs in COPD patients. (Figure 5).

Prescribing pattern of bronchodilators

Out of 293 bronchodilators, Etophylline+theophylline (Deriphyllin-34.47%) was the most commonly prescribed bronchodilator. (Figure 6).

Prescribing pattern of antibiotics

A total of 127 antibiotics were prescribed in 120 prescriptions. Based on the class of antibiotics, 101(83.46%) drugs were beta lactam antibiotics, 11 (8.65%) drugs were fluoroquinolones, 8 (6.29%) drugs were macrolides and 2 (1.5%) drugs were tetracyclines. (Table 2).

Prescribing pattern of corticosteroids

A total of 118 corticosteroids were prescribed for 120 COPD patients. Among corticosteroids, 42 (35.59%) drugs were budesonide, 33 (927.96%) drugs were hydrocortisone, 29 (24.57%) drugs were methylprednisolone, 12 (10.16%) drugs were Dexamethasone, 2 (1.6%) drugs were deflazacort. So, in this study, budesonide was the most commonly prescribed corticosteroids.

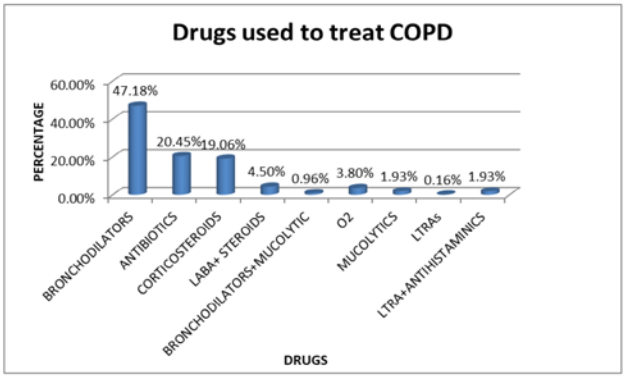

Figure 5: Prescription pattern of COPD drugs.

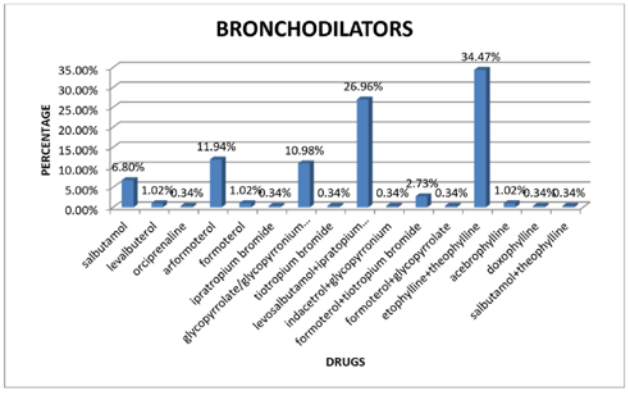

Figure 6: Drug wise prescribing pattern of bronchodilators.

Table 2: Class Wise distribution of antibiotics.

Drug Class	Number Of Drugs (*n*=127)	Percentage
Beta lactam antibiotics	101	83.46%
Fluoroquinolones	11	8.65%
Macrolides	8	6.29%
Tetracyclines	2	1.5%

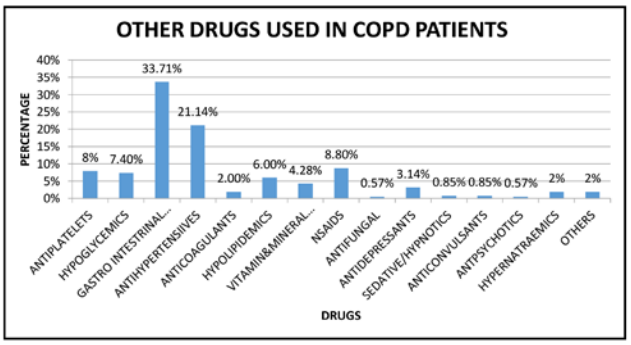

Figure 7: Prescribing pattern of other drugs used in COPD patients.

Among the route of administration of corticosteroids, 75 (63.55%) corticosteroids were administered parenterally, 41 (34.74%) corticosteroids were administered via inhalation route and 2 (1.66%) drugs were administered orally. So, in this study, the parenteral route was most commonly used for corticosteroid administration.

Prescribing pattern of other drugs among COPD patients

Among 971 drugs prescribed for 120 COPD patients, 350 drugs were not specific for the treatment of COPD. (Figure 7).

Route of administration of drugs in COPD patients

A total of 971 drugs were prescribed among 120 prescriptions. 457 (47.06%) drugs were given parenterally, 279 (28.73%) drugs were given via inhalation route and 235 (24.20%) drugs were given orally. (Figure 8).

DISCUSSION

The study was conducted at a tertiary care hospital, Kannur to study the prescription pattern and to assess

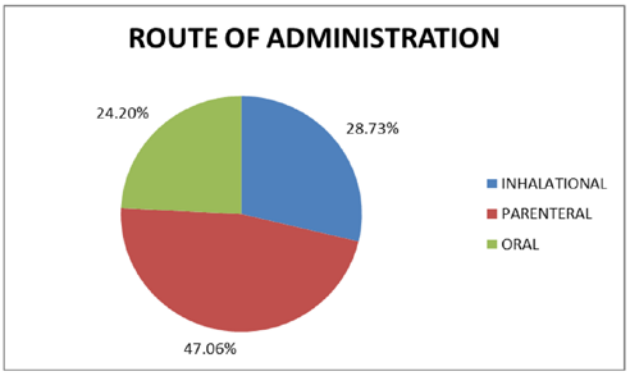

Figure 8: Route of administration of drugs in COPD patients.

whether smoking is a major risk factor among COPD patients. A total of 120 patients, who meet inclusion and exclusion criteria were included in the study. The study was conducted for a period of 6 months.

Among 120 patients, 83 (69.16%) patients were male and 37 (30.83%) patients were female. This may be due to the fact that, in India, tobacco smoking is more common among males and it is a major risk factor for COPD. Similar results were obtained in studies conducted by Salwan P *et al.*[2] Puja B *et al.*[3] and Lakshmi R *et al.*[4]

Out of these 120 patients admitted in hospital, most of the patients were of age group 61-70 years (45patients (37.5%)) and the mean age of the patients were 66.8 years. This may be due to the reduction of respiratory muscle strength and stiffening of the chest wall, which leads to reduction in thoracic compliance and decrease in lung capacity due to aging. Similar results were obtained from studies conducted by Salwan P *et al.*[2] in which the mean age was 66.9 years which is very similar to the result of this study. Other studies conducted by Sunil S *et al.*[5] Reddy A S *et al.*[6] and Unni A *et al.*[7] also supported that COPD is more common in the 61-70 years age group.

In our study, the major comorbidity associated with COPD was Hypertension (38.33%) followed by Diabetes mellitus (30%) and CAD (25.83%). Similar results were obtained from studies conducted by Maqusood M *et al.*[8] in which hypertension was the most common comorbidity. Other studies conducted by Kumar S *et al.*[9] Teli A *et al.*[10] and A Nashida *et al.*[11] showed that Hypertension was the most common comorbidity followed by DM.

Out of 120 patients, smoking (66.66%) was found to be the major risk factor of COPD. This is because smoking reduces the defense mechanism of lungs against infections, and causes swelling in air tubes, thereby narrowing the air passages and destroying air sacs. Similar results were obtained from studies conducted by Sawant MP *et al.*[12] Divya Rekha O *et al.*[13] Teli A *et al.*[10] and Bhatt SP *et al.*

Among 80 COPD patients with smoking as a risk factor, 49 patients were ex- smokers (61.25%) and 31 patients were current smokers (38.75%). Studies conducted by Maqusood M *et al.*[8] Divya Rekha O *et al.*[13] and Dr. Gorle S B *et al.*[14] supported this finding. Most of the COPD patients with smoking as a risk factor had a pack years of 11-20 . 37 patients (46.25%). This result was similar to the study conducted by Ramakrishna R *et al.* in the pulmonology department of Katuri Medical College Hospital, Guntur.

Among other risk factors of COPD, indoor pollution (16.66%) due to dust, smoke and fuel from furnaces was the most common followed by outdoor pollution (10%) from industries and workplaces. These were considered as risk factors due to the presence of noxious particles and chemicals which may affect lungs adversely. According to GOLD, all these factors were considered to be the causes of COPD.[1]

Among COPD drugs, bronchodilators (47.18%) were the most commonly prescribed drug class followed by antibiotics (20.45%) and corticosteroid (19.06%) respectively. This result was similar to the study conducted by Kumar S *et al.*[9]

Among bronchodilators, etophylline theophylline (34.40%) was most commonly prescribed bronchodilator followed by levosalbutamol + ipratropium bromide (26.96%). Similar results were obtained in studies conducted by Salwan P *et al.*[2] and Unni A *et al.*[7]

Among antibiotics, beta lactam antibiotics (83.46%) were the most commonly prescribed drug class. This result was similar to the study conducted by Kumar S *et al.*[9]

Among 118 corticosteroids, Budesonide (35.59%) was the most commonly prescribed corticosteroids followed by hydrocortisone (27.96%). And parenteral (63.5%) route was most commonly used. Similar results were obtained in studies conducted by Abraham N *et al.*[15]

Among other 350 drugs prescribed, Gastro-intestinal drugs (33.71%) were most commonly prescribed followed by antihypertensive drugs (21.14%).

Among all the drugs prescribed, parenteral route (47.06%) was most commonly preferred route of administration followed by inhalation route (28.73%) and oral route (24.20%). This result was similar to the study conducted by Sawant M P *et al.*

CONCLUSION

This study was performed to assess the prescription pattern, comorbidities, risk factors and age wise distribution of COPD patients in a tertiary care hospital. In this study, a major number of patients were in the age group of 61-70 years. Hypertension was the most common comorbidity followed by diabetes mellitus. Smoking was the major risk factor for COPD and most of them were ex-smokers. After smoking, indoor pollution due to fumes and biomass fuels was the second major risk factor followed by outdoor pollution due to occupational exposure and environment. On evaluating the prescription pattern of COPD drugs, bronchodilators were the most commonly prescribed drugs followed by antibiotics and corticosteroids respectively. Etophylline theophylline was the most commonly prescribed bronchodilators and Beta lactam antibiotics were most commonly prescribed antibiotics.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

ABBREVIATIONS

CAD: Coronary Artery Disease; **CKD:** Chronic Kidney Disease; **COPD:** Chronic Obstructive Pulmonary Disease; **LTRA:** Leukotriene Receptor Antagonist; **NSAID:** Non-steroidal Anti-Inflammatory Drugs.

SUMMARY

- A total of 120 patients of either sex admitted to the pulmonology department of a tertiary care hospital were included in the study.
- Maximum number of patients were in the age group of 61-70 years. The occurrence of COPD was more among males than females.
- Hypertension was the most common comorbidity among COPD patients followed by diabetes mellitus.
- Smoking was the major risk factor among COPD patients and most of them were ex-smokers. Most of the smoking patients had pack years of 11-20. After smoking, indoor pollution due to fumes and biomass fuels was the second major risk factor followed by outdoor pollution due to occupational exposure and environment.
- Among COPD drugs, bronchodilators were the most commonly prescribed drugs followed by antibiotics and corticosteroids respectively. Etophylline + theophylline was the most commonly prescribed bronchodilator.
- Beta lactam antibiotics were most commonly prescribed antibiotics.
- GI drugs were the most commonly prescribed class of drugs among other drugs followed by antihypertensive drugs.
- Parenteral route was the most commonly used route of administration of drugs followed by inhalation route and oral route respectively.

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