

Article

A study of prescription pattern among COPD patients in a tertiary care hospital

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Abstract: Background: Irrational prescribing practices have a negative impact on the health and economy of individuals and society as a whole, resulting in resource wastage and widespread health hazards. The aim of this study was to analyze the drug prescribing pattern in patients with Chronic Obstructive Pulmonary Disease (COPD).

Methods: This prospective study included outpatients with COPD. Various parameters were recorded, including patient age, gender, outpatient ID number, occupation, smoking history, alcohol consumption, disease condition details, co-existing diseases, and prescribed medication details. The drug selection was assessed based on the Global Initiative for Chronic Obstructive Lung Disease (GOLD) guidelines. Data was collected using a specially designed data entry form and tabulated. The results were expressed as percentages.

Results: The prescription data of 72 patients were analyzed in this study, comprising 58 males (80.56%) and 14 females (19.44%), with a mean age of 55.95 years. The male-to-female ratio was 4.14:1. Out of the total 72 patients, 62 (86.11%) were smokers, with 25 (40.32%) currently smoking and 37 (59.68%) being ex-smokers. Hypertension was the most common comorbidity, present in 35 (48.61%) patients. Inhalation was the most common route of drug administration in the study, followed by the oral route. The most frequently prescribed drugs were Formoterol (LABA) in 58 (81.56%) patients, Budesonide in 54 (75%), Acebrophylline in 44 (61.11%), while Terbutaline was the least used in 7 (9.72%) patients and Methylprednisolone in 6 (8.33%) patients.

Conclusion: The data revealed a low utilization of monotherapies, specifically long-acting muscarinic antagonist (LAMA), and a high utilization of combination therapies, particularly those containing inhaled corticosteroids (ICS). The drug prescribing pattern analysis aims to provide feedback and create awareness about appropriate medicine use.

Keywords: Chronic obstructive pulmonary disease; Prescription pattern; GOLD guidelines.

1. Introduction

Prescription pattern monitoring studies are basically drug utilization studies targeting prescription and administration of drugs [1]. They promote the appropriate use of monitored drugs as also reducing their abuse or misuse. Inappropriate prescribing patterns lead to failure in therapeutic effectiveness, increased exacerbation, decreased quality of life along with higher costs [2]. As Per WHO "Chronic obstructive pulmonary disease (COPD) is a lung ailment that is characterized by a persistent blockage of airflow from the lungs. It is an under-diagnosed, life-threatening lung disease that interferes with normal breathing and is not fully reversible [3,4].

Although national guidelines for COPD management have been available for nearly two decades, questions were raised concerning their quality and supporting evidence. To standardize the care of patients

with COPD and present evidence-based recommendations, the National Heart, Lung, and Blood Institute and the World Health Organization launched the Global Initiative for Chronic Obstructive Lung Disease (GOLD) in 2001. This report was updated most recently in 2017 [5]. The goals of the GOLD organization are to increase awareness of COPD and reduce morbidity and mortality associated with the disease. The airflow limitation is usually both progressive and associated with an abnormal inflammatory response of the lungs to noxious particles or gases. Although COPD primarily affects the lungs, it also is associated with significant consequences. Current guidelines have moved away from chronic bronchitis and emphysema as descriptive subsets of COPD. This is based on the observation that the majority of COPD is caused by a common risk factor (cigarette smoking), and most patients exhibit features of both chronic bronchitis and emphysema. Therefore, emphasis is currently placed on the pathophysiologic features of small airways disease and parenchymal destruction as contributors to chronic airflow limitation. The airways of the lung and the parenchyma are both susceptible to inflammation and the result is chronic airflow limitation that characterizes COPD. Although the mortality of COPD is significant, morbidity associated with the disease also has a significant impact on patients, their families, and the healthcare system.

Screening of prescriptions and evaluation of drug utilization can identify the issues regarding drug use and helps in contributing feedback to prescribers to create awareness about irrational drug use. Drug utilization studies provide useful insights into current prescribing practices and can thus help to reform and update practices in clinical medicine and pharmacotherapy. Keeping this in the background, the present study is undertaken to analyze the prescribing pattern, extent, rationality, and adherence to GOLD guidelines [5] in the treatment of COPD.

2. Methodology

This was a prospective, observational study was conducted on cases of COPD patients in the the outpatient Department of Respiratory Medicine in collaboration with the Department of Pharmacology, Gandhi Medical College, Bhopal India over a period of one year from April,2019 to March,2020. The study was conducted after approval from the institutional ethics committee letter no.35544-46/MC/IEC/2018 and written informed consent was taken from each patient involved in the study.

2.1. Inclusion criteria

COPD patients attending the outpatient Department of Respiratory Medicine.

2.2. Exclusion criteria

patients with tuberculosis or bronchial asthma, terminally ill cancer patients, patients in intensive care unit, and pregnant, lactating women.

2.3. Data collection

Relevant data were collected, including the following details;

- demographic data: patient age, gender, OPD ID number occupation, smoking history, alcoholic;
- disease condition details: duration, gradation and co-existing diseases, if any;prescribed drug details: dose, frequency, route of administration, and duration.
- prescribed drug details: dose, frequency, route of administration, and duration.

Drug selection was assessed as per GOLD guidelines [5]. Fixed drug combinations were calculated separately. Adherence to GOLD guidelines was studied by assuming that drugs recommended as the first line should be the most frequently prescribed ones with the highest utilization. Data was collected by using the specially designed data entry form. The relevant information was collected for each patient from prescribed COPD treatments. Health related quality of life indices were obtained using validated questionnaires. This data was analysed by using microsoft excel and results were presented as percentages.

3. Results

In the current study we analysed prescription data of 72 patients [58 males (80.56%) and 14 females (19.44%)], with a mean age of 55.95 years (Table 1). Male and female ratio is 4.14:1, out of total 72 patients,

62 (86.11%) are smokers in which 25 (40.32%) are currently smoking with 37 (59.68%) are ex-smokers (Table-2). Out of total patients, 60 (83.33%) have comorbidities. Hypertension is the most common comorbidity having 35 (48.61%) of patients. followed by DM 20(27.78%) and CAD 17(23.61%).

Table 1. Demographic table showing age and gender distribution of COPD patients

Age (Years)	Male N (%)	Female N (%)	Total no. of patients
30-39	1 (1.39%)	1 (1.39%)	2 (2.78%)
40-49	13 (18.05%)	9 (12.5%)	22 (30.56%)
50-59	20 (27.77%)	2 (2.78%)	22 (30.56%)
60-69	17 (23.61%)	1 (1.39%)	18 (25%)
70-79	7 (9.72%)	0 (0%)	7 (9.72%)
80-89	0 (0%)	1 (1.39%)	1 (1.39%)
Total	58 (80.56%)	14 (19.44%)	72

Table 2. Showing smoking status of the patients

Smoking Status	No. Of Patients	Percentage
Smokers	62	86.11
Ex-smokers	37	59.68
Current smokers	25	40.32
Non-smokers	10	13.89

3.1. Routes of Drug Administration [Table 3]

Inhalation route (57.69%) was the most common route of administration of drugs in this study followed by Oral route (42.31%) was the second most common route.

Table 3. Showing details of routes used in administration of drugs

Routes	No. Of Drugs	Percentage
Inhalational	225	57.69
Oral	165	42.31
Total	390	

3.2. Drug utilization pattern [Table 4, Table 5]

In this prospective study of 72 patients, Formoterol was maximum prescribed drug used in 58 (81.09%) of patients followed by Budesonide 54 (75%), Acebrophylline 44 (61.11%), followed by Levocetirizine 39 (54.17%), Salbutamol 38 (52.78%) and Montelukast was used patients 36 (50%), followed by Ipratropium 35 (48.61%), Tiotropium which was used in 25 (34.72%) of patients, Hydrocortisone 17 (23.61%), Fluticasone in 15 (20.83%) followed by Amoxicillin 14 (19.44%) followed by Azithromycin used in 9 (12.50%) patients, Theophylline in 7 (9.72%), Terbutaline which was used in patients that is 7 (9.72%) and Methylprednisolone was used in 6 (8.33%) patients. In the present study, the most used combinations included levocetirizine + montelukast (76.38%), salbutamol sulphate + ipratropium bromide + budesonide (68.05%), and formoterol (LABA) + fluticasone (51.39%). Drug combinations were used to decrease COPD symptoms, increase drug effectiveness and decrease the medication dose.

Table 4. Drug utilization pattern

Class of drugs	Drugs	No. of prescriptions	%	Route of administration
Antibiotics	Amoxicillin & Clavulanic acid	14	19.44	Oral
	Azithromycin	9	12.5	Oral
	Levofloxacin	3	4.17	Oral
Anticholinergic	Tiotropium	25	34.72	Inhalational
	Ipratropium	35	48.61	Inhalational
Antihistamines	Levocetirizine	39	54.17	Oral
Leukotriene Antagonists	Montelukast	36	50	Oral
Methyl xanthines	Acebrophylline	44	61.11	Oral
	Theophylline	7	9.72	Oral
Short acting β 2 agonist (SABA)	Salbutamol	38	52.78	Inhalational
	Terbutaline	7	9.72	Oral
Long acting β 2 agonist (LABA)	Formoterol	58	80.5	Inhalational
Inhaled steroids	Budesonide	54	75	Inhalational
	Fluticasone	15	20.83	Inhalational
Systemic steroids	Methylprednisolone	6	8.33	Oral

Table 5. Combination of drugs used in COPD

Combination of drugs	No. of Patients	Percentage
Levocetirizine+ Montelukast	55	76.38
Theophylline+Ethyldiamine	15	20.83
Beclomethasone+Levosalbutamol	14	19.44
Bromhexine+Guiphenesin+Terbutaline+Menthol	13	18.06
Etophylline+Theophylline	32	44.44
Salmeterol+Fluticasone	35	48.61
Formoterol+Fluticasone	37	51.39
Salbutamol Sulphate+Ipratropium Bromide+Budesonide	49	68.05
Salbutamol Sulphate+Ipratropium Bromide	34	47.22

4. Discussion

Based on the result of the present study, mean age of the total COPD population is 54.6 years, which is not accordance with the study done by David price (2014) Which showed that the mean age of the total COPD population was 71.4 years [6] and also not accordance with CAGE study (2008) in which the mean age of COPD population was 69.9 years [7]. It is also not accordance with D B Jyothi et al has studied (2019) in which mean age of the total COPD population is 42.7 years [8]. It is because of life span relatively less in India. According to the present study 80.56% patients were male, while David price et al; study 2014,53% patient were male [6]. CAGE study (2008),60% patient were male [7], so it is not accordance with the present study. This variation is because of smoking is more common among male than female in India. But it is accordance with the study of Arya Gigi (2015) who reported that 78% patient were male [9], in accordance with Miriam et al. [10] study which shows that 79.2% patient were males.

Similar results were obtained in studies conducted by Salwan P et al. [12] Puja B et al. [13] and Lakshmi R et al. [14] Present study shows that 86.11 % patient were smokers which is not close to Arya Gigi study 2015 according to which 100% patient were smokers [9]. 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. [15] Divya Rekha O et al. [16] and Teli A et al. [17].

The present study shows that 56.94% patients are ex-smokers, which is near to the David price study (2014) which shows that 56.2% patients were ex-smokers [6]. Studies conducted by Maqusood M et al. [18] Divya Rekha O et al. [16] supported this finding. This study also shows that 40.32% patients were still smoking, which is accordance with CAGE study (2008) which showed that 40% of patients were current smokers [7].

In the present study, 81.08% of patients have co-morbidities, which is close to CAGE study (2008) which shows that 83.33% of patients had co-morbidity [7]. In our study, the major comorbidity associated with COPD was Hypertension (48.61%) followed by Diabetes mellitus (27.78%) and CAD (23.61%). Similar results were

obtained from studies conducted by Maqusood M et al. [18] in which hypertension was the most common comorbidity. Other studies conducted by Kumar S et al. [19] and Teli A et al. [17] showed that Hypertension was the most common comorbidity followed by DM. Present study shows that 75% of patients have received inhaled corticosteroids while in CAGE (2008) study 67% [7] and David price study (2014) 60% patients had received ICS [16] so these are not accordance with the present study.

In the present study Tiotropium is used in 34.72% of patients which is near to David price study (2014) in which it was used in 34.6% of patients [6]. In the present study, Formoterol is used in 80.56% of patients, which is not accordance with David price study (2014) in which it was used in 54.6% of patients [6]. SABA's are used in 52.78% of patients in the present study it is not accordance with David price study (2014) in which they were used only in 11.8% of patients.[6] This result was similar to the study conducted by Kumar S et al. [19], in which bronchodilators were the most commonly prescribed drug class. In the present study, Ipratropium was used in 48.61% of the patients, which is not accordance with David price study (2014) in which it was used only in 2.1% of patients [6]. In the present study methylxanthines are used in 71% of patients while in Arya Gigi study 2015 they were used in only 19% of patients [9] so it is not accordance with the present study. In Arya Gigi study (2015) Doxofylline was mostly prescribed Methylxanthine (56.89%), this is not accordance with the present study in which it was last prescribed, here Acebrophyline was mostly prescribed Methylxanthines. In the present study, antibiotics are used in 36.11% of patients. It is not accordance with Arya Gigi study (2015) in which these are used in 42% of patients [9]. In the present study, Amoxicillin is most prescribed antibiotics it is not accordance with Arya Gigi study (2015) in which ceftriaxone was most prescribed antibiotics. This result was similar to the study conducted by Kumar S et al.[19]Azithromycin is second most prescribed antibiotic in the present study it is accordance with Arya Gigi study in which it was also second most prescribed antibiotic [9]. Among corticosteroids, Budesonide (75%) was the most commonly prescribed corticosteroids. Similar results were obtained in studies conducted by Abraham N et al. [20]. In the present study, Montelukast was used in 50% of patients it is not accordance with David price study in which it was used in 2.1% of patients [3]. It is not accordance with CAGE study also in which it was not used. Antihistamine is used in 54.17% of patients in present study it is not accordance with David price and CAGE where it was not used.

In David price study (2014) ICS+LABA (26.7%) was most frequently used combination [6]. While in CAGE study LABA + LAMA (32%) was most frequently used combination[7] these are not accordance with the present study and in Arya Gigi study SABA + SAMA +ICS was most frequently used combination, this is accordance with the present study in which ICS+SABA+SAMA (68.05%) was most frequently used combination of drugs. Second, most frequently used combination in David price study was ICS+LABA+LAMA it is not accordance with the present study in which ICS+LABA is second most common. Among all the drugs prescribed, inhalational route was most commonly preferred route of administration followed oral route. This result was similar to the study conducted by Maqusood M et al. [18].

In the CAGE study (2008) separate smoking cessation counselling was given to 95% of patients [7]. These findings were not in accordance with the present study in which it is not given to any patients. In a CAGE study (2008) 9% of patients were referred for pulmonary rehabilitation [7]. It also not accordance with the present study in which no patients are referred to this. It is seen in the present study of drugs (79.85%) are prescribed according to the GOLD (a global initiative of obstructive lung disease) criteria recommendation [5]. In some cases, the discordance between GOLD treatment recommendation and day to day clinical practice is normal because of difference individual patient needs and co-morbidity this is supported NICE [11] guidelines which advocates that individual needs and should be taken into account while prescribing.

5. Conclusion

Overall, data from this analysis suggest that adherence to GOLD guidelines does not have a perceivable impact on symptom prevalence, exacerbation rate or lung function. We documented low utilization of monotherapies (specifically LAMA) and high utilization of combination therapies (particularly ICS containing). Overall, improving adherence to guideline recommendations should be promoted across all specialty groups. Our results also suggest that treatments are not stepped down as recommended by guidelines, potentially resulting in significant levels of overtreatment. The prescribing trend that was observed at the hospital appears to be in concordance with the current guidelines for the management of COPD

patients. Drug prescribing pattern aims to provide feedback and to create awareness about medicine. The demographic results of patients revealed that males are more affected because of their addictions to cigarette and tobacco. medication costs can be reduced by implementing preventive strategies but not limited to home care services, rehabilitation therapies, smoking cessation programs, medication assessment, and patient compliance programs. Future researchers should examine the treatment strategies and interventions that may help to reduce the burden of COPD.

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Conflicts of Interest: Authors declare no conflict of interests.

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