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Original Research Article

Study of drug prescription pattern among COPD patients admitted to medicine in-patient department of tertiary care hospital

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ABSTRACT

Background: Drug utilization studies can provide insights into a pattern, quality, determinants and outcomes of drug use. COPD is one of the leading causes of death among Indian population and there is a lack of drug utilization studies in this field.

Methods: A prospective, observational study was conducted among the patients admitted in inpatient department of medicine ward of Tertiary care hospital. Data has collected from COPD patients admission records. Parameters like demographic profile, common associated diseases, WHO core drug indicators and commonly prescribed drugs were assessed from the prescriptions.

Results: A total 284 inpatient records were scrutinized. Out of 284 patients, 66.19% were male and 33.80% were female. Average numbers of drugs per prescription were 7. Mean age was 66.9 years. Antimicrobials (88.7%) were most commonly prescribed drugs followed by inhaled bronchodilators (84.5%).

Conclusions: Study data highlights that average numbers of drugs prescribed were higher than WHO norms, antibiotics were commonly used, and drugs prescribed with brand names were higher than the generic names.

Keywords: Bronchodilators, COPD, Drug utilization

INTRODUCTION

Drug treatment forms a major portion of health expenditure. Irrational use of drugs is a major concern in modern clinical practice, more than half of all medicines are prescribed, dispensed or sold inappropriately and that half of all patients fail to take them correctly. Thus the concept of "Rational use of drugs" has been introduced which is defined by WHO as "Patients receive medication according to their clinical needs, in doses that meet their own individual requirements, for an adequate period of time, and at the lowest cost to them and their community. Drug utilization studies can provide insights into a pattern, quality, determinants and outcomes of drug use. Drug utilization research is a useful tool to achieve cost effective healthcare, as it can be the basis for suggesting improvements in drug guidelines and in rational drug use.[1,2]

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]

COPD is a chronic, non-communicable disease which poses a continuous burden on health care infrastructure. More than 3 million people died due to COPD in 2012, which is equal to 6% of all deaths causes. Nearly 90% of COPD mortality has been attributed to low and middle-income countries.[5] COPD prevalence is 5.0% among

Indian males and approximately 3.2% among Indian females over 35 years of age.[6]

Though COPD is one of the major causes of death among Indian population, there is a lack of drug utilization studies of this disease. The objective of this study was to assess the pattern of prescriptions among the patients admitted in Medicine ward of a tertiary care hospital in India.

METHODS

A prospective, observational study was conducted among the patients admitted in inpatient department of medicine ward of Tertiary care hospital, over a period of four months from Jan'16 to Apr'2016. The study was conducted after approval from the institutional ethics committee and written informed consent was taken from each patient involved in the study.

Inclusion criteria

Patients of all age groups suffering from COPD as the primary diagnosis and admitted in the medicine ward were included. Out Patients Department (OPD) patients, Patients who were not willing to participate in the study were excluded.

Total 284 patient's records were analyzed. Demographic profile, common associated conditions, Core drug use indicators, commonly prescribed drugs as per Anatomical Therapeutic Chemical Classification (ATC) and WHO core indicators were assessed from the prescriptions.

Statistical analysis

The data was analyzed with the help of Microsoft Excel software. Drugs were classified according to the WHO ATC classification and assessed according to WHO EML (Essential Medicine List).

RESULTS
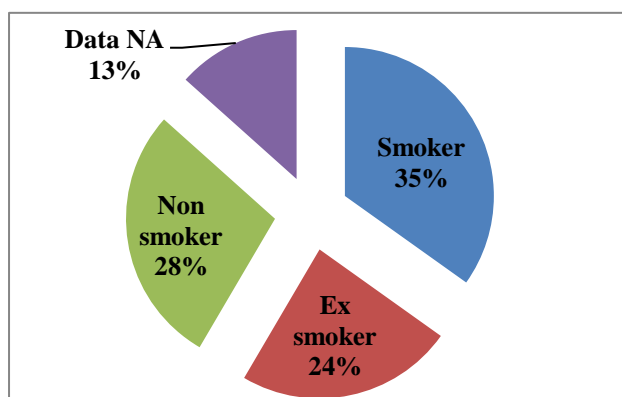
Figure 1: History of smoking.

Data from 284 prescriptions was analyzed. Out of 284 patients, 188 were male patients and 96 were female.

Among study population maximum patient (48.59 %) were in the age group of 61-70 yrs. As shown in the Figure 1, history of smoking was present in 59% of patients including current smoker (35%) and ex-smokers (24%).

The most common comorbid condition encountered among COPD patients was Hypertension (33.80%) followed by Diabetes (19.36%), Congestive cardiac failure (18.30%), Anemia (8.80%), Ischemic Heart Disease (7.04%), Cor pulmonale (5.28%), TB (3.87%) and Community acquired pneumonia (3.52%).

As per our study data and as shown in Table 1, average number of drugs prescribed per patient were 7 drugs. Percentage of drugs prescribed with generic name was 7.38%. Antimicrobials were most commonly prescribed drugs (88.7%). Most commonly used antibiotics were Amoxicillin and Clavulanic acid as FDC, followed by Azithromycin, Ceftriaxone, cefotaxime, Metronidazole, linezolid. As shown in Figure 2 Dosage forms prescribed were, injectable 55.30%, Respules 21.50%, Syrup 10.20%, Tablets 12.10%.

Table 1: Core drug use indicators.

Core drug use indicators	
Average number of drugs per prescription	7 drugs
Percentage of drugs prescribed by generic name	07.38%
Percentage of encounters resulting in prescription of an antibiotic	88.70%
Percentage of encounters resulting in prescription of an injection	55.30%
Percentage of drugs prescribed from essential drugs list or formulary	43.90%
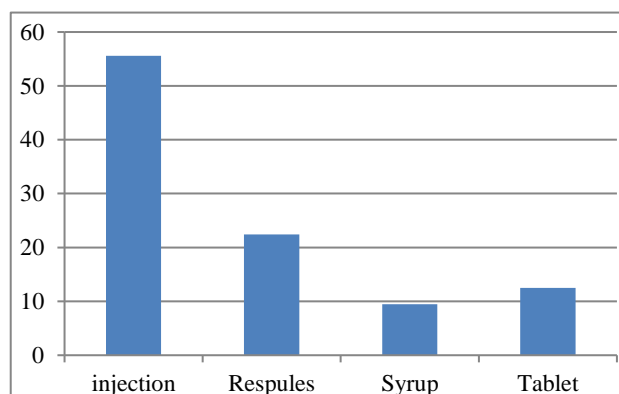
Figure 2: Dosage form used in percentage.

Percentage of drugs prescribed from WHO essential drugs (Essential Medicine list) of 2015 were 43.90% while that from NLEM (National List of Essential Medicine) 2015 was 52.38%.

Fixed dose combinations were commonly prescribed (96.83% of study group patients) with an average of 2.38 FDC per patient.

As shown in Table 2, Inhaled Steroids such as budesonide was prescribed by 84.5% of patients while systemic steroids like hydrocortisone were prescribed to 73.94%, followed by dexamethasone (3.86%). Among Bronchodilators, β2 agonist such as levosalbutamol (84.5%) and anticholinergic drugs like Ipratropium bromide (84.5%) were commonly used.

Among Methylxanthines, theophylline was most commonly prescribed (69.71%), followed by aminophylline and doxofylline. Mucolytics such as ambroxol and bromhexine were prescribed to 5.62% of study group patients. Mast cell stabilizer, Montelukast was prescribed to 3.87% of study group patients.

Drug prescribing pattern in study group was analyzed with help of DDD/100 bed days, PDD, DDD, and PDD/DDD ratio which is as shown in Table 3. The prescribed daily dose (PDD) is the average daily dose prescribed, as obtained from a representative sample of prescriptions. It is used as indicator for adequate drug dosing. The ratio of more than one (>1) suggests overdosing. As shown in Table 3, value more than 1 are suggesting as overdosing of that drug.

Table 2: Categories of drugs used.

Category of drugs	
Drugs	Percentage (%) of patient prescribed (out of study population)
Antibiotics	88.7%
Inhaled Steroids - Budesonide	84.5%
Systemic Steroid - Hydrocortisone	73.9%
Beta 2 agonist Levosal butamol	84.5%
Anticholinergics Ipratropium bromide	84.5%
Methylxanthine - Theophylline	69.7%
Mast cell stabilizer - Montelukast	3.87%

Table 3: Drug prescribing trends in COPD according to present study data.

Drug	WHO DDD	DDD/ 100 bed-days	PDD	PDD/WHO DDD Ratio	ATC code
Amoxicillin	3	5.74	4.15	>1	J01CR02
Cefotaxime	4	1.24	1.4	<1	J01DD04
Ceftriaxone	2	2.48	1.2	<1	J01DD04
Azithromycin	0.3	0.35	0.25	<1	J01FA10
Hydrocortisone	30	36.34	26.3	>1	A01AC03
Budesonide	9	11.42	24.81	>1	A07EA06
Theophylline	0.4	0.77	0.74	>1	R03DA04
Ipratropium bromide	0.3	0.52	0.37	>1	R03BB01
Levosalbutamol	10	12.85	31.02	>1	R03AC02
Amlodipine	5	1.78	2.14	<1	C08CA01

DISCUSSION

As per data of the present study, COPD was more common among males as compared to females; this finding is in accordance with results of the previous studies conducted by UNNI, Aswathy et al.[7] A maximum number of COPD patients were from age group 61-70 years with minimum age being 34 years to be diagnosed with COPD. Chronic obstructive pulmonary disease (COPD) is a slowly progressive disease and its symptoms usually develops late over the years; hence COPD may be more commonly seen elderly. History of smoking is one of the major risk factors for COPD and our study results are suggestive of same as smoking history was positive among 59% of study population. Hypertension was most common comorbid condition among our study population which is similar to the results obtained from the study of Unni A et al. Other comorbid conditions were diabetes followed by congestive cardiac failure, cor pulmonale, TB; Community-acquired pneumonia, Ischemic heart disease, and anemia.

As per our study data, an average number of drugs prescribed were 7 drugs per patient, which is lower than results of previous study by Bahmed F et al, but it is higher than WHO norms and previous similar study Shinde et al, which states that the average drugs per prescription should be 2 to 3 drugs.[8-10] This may attribute to inpatient management of acute exacerbation, comorbid conditions and to prevent further recurrent episodes, but prescribing multiple drugs to the patient should be closely monitored to avoid negative consequences of polypharmacy such as higher healthcare costs, ADEs, drug-interactions, medication non-adherence and should be kept to minimum required drugs.

Percentage of drugs prescribed with generic name was only 7.38%, as per WHO recommendations maximum drugs should be prescribed with by generic name, which will decrease the cost to patient and will able to help to increasing compliance.

Most of the patients were admitted for management of acute exacerbation of COPD. An exacerbation is acute event with worsening of patient's respiratory symptoms. Most of the exacerbations are due to respiratory tract infections. Antibiotics were most commonly prescribed drugs, about 88.7% of study group patients were prescribed with antibiotics, and it is similar to the results of previous studies in India by Unni, A. et al, and Veettil, S et al.[7,11] High percentage of prescribing antibiotics would contribute to increase in prevalence of resistance strains of pathogenic organisms. Most commonly used antibiotics were Amoxicillin and Clavulanic acid as FDC, followed by Azithromycin, Ceftriaxone, cefotaxime, Metronidazole. These findings are in accordance with GOLD guidelines according to which antibiotics may be required in management infective exacerbation COPD who have increased incedence dyspnea, sputum volume, and sputum purulence. The choice depends on the local bacterial resistance pattern. Usually, initial empirical treatment is administered with an aminopenicillin with or without clavulanic acid, macrolide. As per one of similar study Nissly T et al, antibiotics help to hasten the recovery compared to placebo group. Respiratory tract infections are one of the common causes for acute exacerbation of COPD, hene the use of antibiotics in COPD patients may be necessary but it should be based on culture and sensitivty pattern of antibiotics.[12,13]

Dosage prescribed in injectable form were 55.30%, this may attribute to the study population from inpatient department of medicine where injectable form of drugs may be necessary to manage acute COPD exacerbation.

Percentage of drugs prescribed from WHO essential drugs (Essential Medicine list) of 2015 were 43.90% while that from NLEM (National List of Essential Medicine) 2015 was 52.38%. Physicians should be sensitized to increase drugs prescribing from essential medicine list as these medicines are selected with due regard to public relevance, evidence of efficacy and safety, and comparative cost effectiveness.

Inhaled Steroid, budesonide, was prescribed to 84.5% of patients, which is as per accordance to GOLD guideline and similar results have been obtained in previous studies results of by Unni. A. et al, and Veettil S et al.[7,11] Inhaled corticosteroids improve lung function and reduce the frequency of exacerbations.

Systemic steroid like hydrocortisone was prescribed to 73.94% of patients, followed by dexamethasone. As recommended by GOLD guidelines, systemic steroids and antibiotics can shorten recovery time, improve lung function and arterial hypoxemia, and reduce the risk of

early relapse; treatment failure and length of hospital stay.[14] Most commonly used bronchodilators were theophylline with etophylline (69.7%) and levosalbutamol with ipratropium bromide (84.5%), used mostly in fixed dose combination forms. These drugs are crucial for symptomatic management in COPD and its acute exacerbation. As per GOLD guidelines, inhalation route is preferred and drugs such as beta 2-agonists, anticholinergics, theophylline or combination therapy can be used. These can be used either as-needed or on regular basis.[15] Mast cell stabilizer, Montelukast was prescribed to only 3.87% of study group patients) probably considering the cost of the drug and the socio-economic status of patients attending the government hospital setup.

Fixed dose combination (FDC) was prescribed to 96.83% of the total study group with average 2.38 FDC per patient; this may be because antibiotics and bronchodilators were commonly prescribed in the form of fixed dose combination (FDC). Prescribing drugs by FDC may improve the compliance. Our findings are in concordance with Global Initiative for Obstructive Lung Disease (GOLD) guidelines, which recommends inhaled beta-2 agonist with or without an anticholinergic agent. Combining bronchodilators of different pharmacological classes may improve efficacy and decrease the risk of side effects compared to increasing the dose of a single bronchodilator. Most of the patients in our study were prescribed multidrug therapy, which could be justified as it is necessary to control the symptoms of acute exacerbation, prevent a recurrent attack, improve patient lung function and hasten the recovery.

The value of PDD/DDD ratio >1 for most of the drugs in study group indicates that there is overdosing of the drugs, physicians could be sensitized to assess and improve the prescribing pattern of the drugs.

This was conducted in the rural hospital, hence the patient attending hospital are mostly from rural area where exposure to biomass fuels like crop residues or woods or animal dung is also widely prevalent and hence COPD may be more common among this population, the same kind of study could be done in urban setting to get further comparable data.

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