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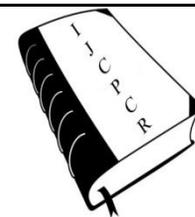
IDENTIFICATION OF DRUG RELATED PROBLEMS AND PHARMACEUTICAL INTERVENTIONS IN OBSTRUCTIVE LUNG DISEASE PATIENTS AT A TERTIARY CARE TEACHING HOSPITAL

*Fathima[1], V.Karthikeyan[1], Chinnu Johnson[1], Shilpa Elizebth Stephen[1], Afeefa KM[1]

[1]Department of Pharmacy Practice, Grace College of Pharmacy, Kodunthirapully Palakkad, Kerala, 678004, India.

ABSTRACT

Obstructive Lung diseases are preventable and treatable chronic airway diseases with high incidence and prevalence. Pharmacists and clinical pharmacy based pharmaceutical care services have positive impact on therapy outcomes. The aim of this study is to describe drug related problems in patients with obstructive lung disease and to assess interventions provided by the pharmacist to address these problems in the treatment of OLD. A Prospective observational study conducted in Karuna medical college, Palakkad. A total of 90 cases were collected during a period of six months from November 2017 to April 2018.Prescriptions of OLD patients were collected. DRPs were detected and categorised based on Pharmaceutical Care Network Europe (PCNE) version V8.01 classification system for drug related problems. Appropriate interventions for the DRPs were provided. The DRPs were classified according to the PCNE classification V 8.01.The most common problem associated with DRPs is Effect of drug treatment not optimal 30(5.3%) followed by untreated symptoms or indications 28 (5.03%) ,Adverse drug events 25(4.4%).The causes associated with DRPs mainly includes prescribing , dispensing and drug use .In prescribing ,the causes of DRP mainly belongs to Drug selection 127 and the least belongs to Drug form 20.In dispensing , the cause of DRP mainly belongs to Prescribed drug not available 25 (4.4%). Early identification of DRPs and factors associated with them are essential to prevent and resolve DRPs in patients with Obstructive lung diseases.

Key words: Obstructive lung disease, Drug-related problems, Pharmaceutical Care, PCNE.

INTRODUCTION

Obstructive lung diseases (OLD) consist of a group of respiratory disorders characterized by airway obstruction in the lungs of affected patients. It results in severe respiratory morbidity that often results in pulmonary failure and disease-associated mortality[1]. Types of obstructive lung disease include Asthma, Bronchiectasis, Bronchitis and Chronic obstructive pulmonary disease (COPD) [2]. Asthma and COPD, the 2 most common types of obstructive lung disease[3].

COPD is a lung disease that is characterized by a persistent reduction of airflow. The symptoms of COPD are progressively worsening and persistent breathlessness on exertion, eventually leading to breathlessness at rest. It tends to be underdiagnosed and can be life threatening. The more familiar terms "chronic bronchitis" and "emphysema" have often been used as labels for the condition [4]. Asthma is a major non communicable disease characterized by recurrent attacks of breathlessness and wheezing, which vary in severity and frequency from person to person. The objective of pharmacological treatment of chronic obstructive pulmonary disease (COPD) is to prevent and control symptoms, reduce the frequency and severity of exacerbations, and improve general health status and exercise tolerance [5].

The Global Burden of Disease Study reports a prevalence of 251 million cases of COPD globally in

Corresponding Author :- **Fathima** Email:- fathimalubiii@gmail.com

2016.Globally, it is estimated that 3.17 million deaths were caused by the disease in 2015 (that is, 5% of all deaths globally in that year). More than 90% of COPD deaths occur in low and middle income countries. According to the latest WHO estimates, released in December 2016, there were 383 000 deaths due to asthma in 2015.[4] The recent 'Indian Study of Asthma, Respiratory Symptoms and Chronic Bronchitis' (INSEARCH) study of 85,105 men and 84,470 women from 12 urban and 11 rural sites reported the prevalence of chronic bronchitis to be 3.49% (4.29% in males and 2.7% in females) in adults > 35 years. The national burden was thus estimated to be 14.84 million[6].

DRUG RELATED PROBLEM

The increasing number of available drugs and drug users as well as more complex drug regimens led to more side-effects and drug interactions and complicates follow-up [7]. A drug-related problem (DRP) can be defined as an event or circumstance involving drug therapy that actually or potentially interferes with desired health outcomes [8]. DRPs are classified into seven classes, including: Need additional drug therapy, unnecessary drug therapy, ineffective drug, too low or too high dosage, adverse drug reactions, and noncompliance [9].

Majority of hospitalized patients reported to have some kind of DRPs[10-15]. According to studies conducted in Norway, DRPs occurred per patient in internal medicine ward and the presence of DRPs increased approximately linearly with the number of drugs used, for the range of one to more than 11 drugs [11,16]. DRPs affect health outcome negatively [17]. A prospective bedside clinical assessment from internal medicine ward in Jordan found that of the total patients, 98.3% had treatment related problems (TRPs) and on average 9.35 TRPs occurred per patient [16].

IDENTIFYING DRUG THERAPY PROBLEMS

Drug therapy problem are not a dispensing errors or other accidental variations from what the prescriber intended the patient to receive. Such errors and variations are simply mistakes.

SEVEN DRUG THERAPY PROBLEMS

The seven drug therapy problems that pharmaceutical care addresses are
• Unnecessary drug therapy
• Wrong drug (sometimes called in effective drugs)
• Dosage too low
• Adverse drug reaction
• Dosage too high
• In appropriate compliance (sometime called adherence)
• Needs additional drug therapy

Drug therapy problems may be identified during steps 2 and 3, Since this is where the pharmacist gathers patient specific data and critically examines the data to determine if problem exist. In a pharmaceutical care model of practice, the pharmacist goes for beyond counseling to assume responsibility for all patient drug related needs. An understanding of a patients need is important because wherever one or more of a patient's drug related needs are too met, a drug therapy problem develops. So, if pharmaceutical care means finding and fixing drug therapy problems, by definition, pharmacist will have to assume responsibility for ensuring that a patient's drug related needs are being met.

METHODOLOGY

A Prospective observational study conducted in Karuna medical college, Palakkad. The ethical a the study protocol was approved by Institutional Ethics Committee with number SDAT/KMC/E C/12-2017/86 of Karuna Medical College. In our study inpatients and outpatients of both genders above 18 years of age suffering from Asthma, COPD, and Bronchiectasis was included. Lung cancer patients, TB patients, physically inactive patients, mentally retarded patients and patients not willing to participate were excluded from the study.

A total of 90 cases were collected. Patient consent form was prepared and written consent was obtained. Specially designed data entry form was used to collect data related to the patient's demographics, education status, dietary habits, and social habits, past medical and medication history, laboratory values, current treatment of Obstructive Lung Disease. Prescription analysis was done and drug related problems (DRP) were detected from the prescriptions collected and pharmaceutical care interventions were done accordingly. During the study period, patients were followed on daily basis and any change in therapy was noted. The collected data were analysed and assessed for DRP using standard databases like Micromedex, Lexicomp, Medscape etc. Identified DRP and pharmaceutical interventions were classified according to Pharmaceutical Care Network Europe (PCNE) version V8.01 classification system for drug related problems. The basic classification has 3 primary domains for problems, 8 primary domains for causes and 5 primary domains for interventions. In V7 a new section called Acceptance of the Intervention proposals was added, including 3 domains. On a more detailed level there are 7 grouped sub domains for problems, 35 grouped sub domains for causes and 16 grouped sub domains for interventions, and 10 subdomains for intervention acceptance. Those sub-domains can be seen as explanatory for the principal domains [19].

RESULTS

A total of 90 cases of OLD were collected and 556 DRPs were detected. Majority of the patients were

seen between the age group of 61 and 70 years (33.3%), out of which 61(67.7%) were male and 29(32.2%) were female .The demographic details of the patients, Gender distribution [Table1] and Age wise distribution [Table 2].

The main risk factor for COPD is smoking, among the 90 patients 36% (n=46) of the patients were smokers and 17 alcoholics. Smoking is the leading cause of chronic obstructive lung disease. Smoking damages the air sacs, airways, and the lining of patient's lungs. Since drinking alcohol lowers the body's glutathione levels, it can aggravate patient OLD symptoms and cause a flare-up. Decreased lung function: Chronic alcohol consumption is associated with decreasing lung function in patients with lung disease.

It is generally characterized by inflamed and easily collapsible airways, obstruction to airflow, problems exhaling and frequent medical clinic visits and hospitalizations. Types of obstructive lung disease include; asthma, bronchiectasis, bronchitis and chronic obstructive pulmonary disease (COPD). Although COPD shares similar characteristics with all other obstructive lung diseases, such as the signs of coughing and wheezing, they are distinct conditions in terms of disease onset, frequency of symptoms and reversibility of airway obstruction. In our study shows that, the total number of 90 cases collected and the majority around 72.2% (n=65) of the patients had COPD, followed by 16.6% of patients had Asthma (n=15) and 11.1% of patient having Bronchiectasis.

Treatment of co-morbid diseases is really a challenge factor in therapeutic management of OLD among the study population. The data for Co morbid disease characteristics are represented in **Table 4.** Co morbidities along with OLD were Hypertension 33.3% followed by 18.8% Diabetes mellitus [Table4].

Scheme S V8.01

The DRPs were classified according to the PCNE classification V 8.01. The most common problem associated with DRPs is Effect of drug treatment not optimal 30(5.3%) followed by untreated symptoms or indications 28(5.03%) ,Adverse drug events 25(4.4%) [Table 5].

The causes associated with DRPs mainly includes prescribing , dispensing and drug use .In prescribing ,the causes of DRP mainly belongs to Drug selection 127 and the least belongs to Drug form 20.In dispensing , the cause of DRP mainly belongs to Prescribed drug not available 25 (4.4%) [Table 6].

The pharmaceutical Interventions mainly carried out at drug level 156, followed by patient level 123 and at prescriber level 79[Table 8].

Graphical presentation of distribution of causes in DRPs detected among OLD patients. Drug selection contributes 22.8% followed by Drug use problems 15.4% and Patient related problems 12.5%.[Fig No: 2]

Table 1. Gender Distribution in Obstructive Lung Disease

S No	Gender	No of patients (N=90)	Percentage (%)
1	**Male**	**61**	**67.7 %**
2	Female	29	32.2%

Table 2. Age Wise Distribution in Obstructive Lung Disease

AGE GROUP	18-30 years(%)	31-40 years (%)	41-50 years (%)	51-60 years (%)	61-70 years (%)	71-80 years (%)
NO:OF PATIENTS	**2 (2.2%)**	**4 (4.4%)**	**14 (15.5%)**	**23 (25.5%)**	**30 (33.3%)**	**17 (18.8%)**

Table 3. Disease Distribution among OLD Patients

Assessment	No: of Patients N=90	Percentage N=90
Asthma	15	16.6%
COPD	**65**	**72.2%**
Bronchiectasis	10	11.1%

Table 4. Co –Morbidity Status along with OLD

Diseases	No: of Patients N=90	Percentage N=90
Infectious Disease	6	6.6%
Hypertension	**30**	**33.3%**
Diabetes Mellitus	17	18.8%
Thyroid Diseases	4	4.4%
Kidney Diseases	3	3.3%

Heart Diseases	6	6.6%
GI diseases	1	1.1%
Others	3	3.3%

Table 5. Problems Associated with Drug Related Problems as per PCNE Classification

Treatment effectiveness	P1.1	No effect of drug treatment/therapy failure	16(2.8)
	P1.2	Effect of drug treatment not optimal	30(5.3)
	P1.3	Untreated symptoms or indication	28(5.03)
Treatment safety	P2.1	Adverse drug event (possibly) occurring	25(4.4)
Others	P3.1	Problem with cost effectiveness of treatment	14(2.5)
	P3.2	Unnecessary drug treatment	20(3.5)
	P3.3	Unclear problem/complaint	5(0.89)
TOTAL DRP			556(100)

**Table 6. Causes Associated with Drug Related Problems as Per PCNE Classification Scheme S V8.01**

CAUSES OF DRP IN PRESCRIBING			
Primary Domain	PCNE code	Detailed classification	Number (%)
Drug selection	C1.1	Inappropriate drug according to guidelines/formulary	5(0.89)
	C1.2	Inappropriate drug (within guidelines but otherwise contraindicated)	3(0.53)
	C1.3	No indication for drug	32(5.7)
	C1.4	Inappropriate combination of drugs or herbal medications	23(4.1)
	C1.5	Inappropriate duplication of therapeutic group or active ingredient	25(4.4)
	C1.6	No drug treatment in spite of existing indication	29(5.2)
	C1.7	Too many drugs prescribed for indication	10(1.79)
Drug form	C2.1	Inappropriate drug form	20(3.5)
Dose selection	C3.1	Drug dose too low	2(0.35)
	C3.2	Drug dose too high	6(1.07)
	C3.3	Dosage regimen not frequent enough	27(4.8)
	C3.4	Dosage regimen too frequent	2(0.35)
	C3.5	Dose timing instructions wrong, unclear or missing	8(1.43)
Treatment duration	C4.1	Duration of treatment too short	17(3.05)
	C4.2	Duration of treatment too long	7(1.2)
CAUSES OF DRP IN DISPENSING			
Dispensing	C5.1	Prescribed drug not available	25(4.4)
	C5.2	Necessary information not provided	5(0.89)
	C5.3	Wrong drug, strength or dosage advised(OTC)	10(1.79)
	C5.4	Wrong drug or strength dispensed	6(1.07)
CAUSES OF DRP IN DRUG USE			
Drug use process	C6.1	Inappropriate timing of administration/dosing interval	32(5.7)
	C6.2	Drug under administered	24(4.3)
	C6.3	Drug over administered	10(1.79)
	C6.4	Drug not administered at all	12(2.1)
	C6.5	Wrong drug administered	8(1.43)
Patient related	C7.1	Patient uses/takes less drug than prescribed or does not take the drug at all	-
	C7.2	Patient uses/takes more drug than prescribed	-
	C7.3	Patient abuses drug	-
	C7.4	Patient uses unnecessary drug	-
	C7.5	Patient takes food that interacts	2(0.35)
	C7.6	Patient stores drug inappropriately	-
	C7.7	Inappropriate timing or dosing interval	20(3.5)
	C7.8	Patient administers or uses the drug in wrong way	28(5.03)
	C7.9	Patient unable to use drug or form as directed	20(3.5)

| TOTAL DRP			556(100)

Table 7. Pharmaceutical Interventions as per PCNE Classification

Primary Domain	PCNE code	Detailed Classification at Prescriber, Patient, Drug Level	Number (%)
No intervention	I0.1	No Intervention	5(1.78)
At prescriber level	11.1	Prescriber informed only	20
	I1.2	Prescriber asked for information	20 (7.14)
	11.3	Intervention proposed, approved by prescriber	39 (13.9)
	I1.4	Intervention discussed with prescriber	20(7.1)
At patient level	I2.1	Patient counselling	75(33.9)
	12.1	Written information provided	-
	12.3	Patient referred to prescriber	-
	I2.4	Spoken to family member/caregiver	48(17.14)
At drug level	13.1	Drug changed to	10(3.5)
	13.2	Dosage changed to	15(5.3)
	13.3	Formulation changed to	2
	13.4	Instructions for use changed to	17 (6.07)
	I3.5	Drug stopped	35(12.5)
	13.6	New drug added	29 (10.3)

Fig 1. Distribution of Risk Factors among OLD Patients	Fig 2. Percentage distribution of causes related to DRPs among OLD patients

Fig 1. Distribution of Risk Factors among OLD Patients
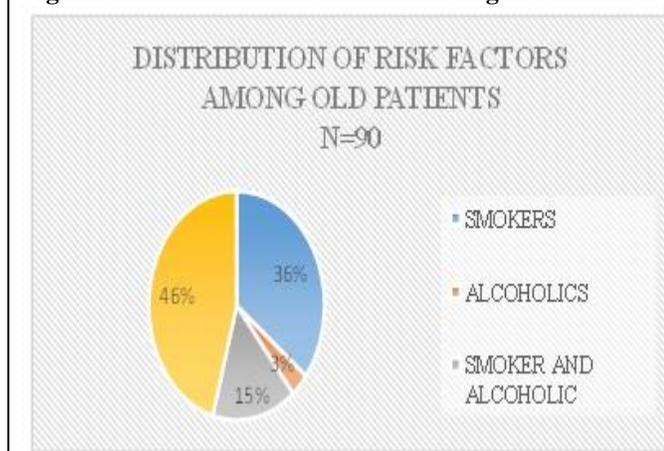
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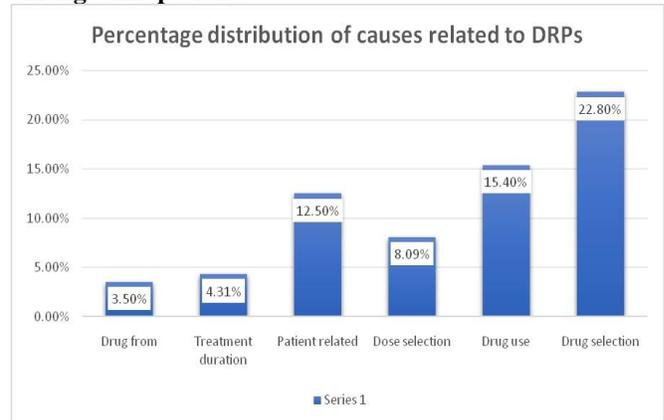
DISCUSSION

In our prospective study the drug related problems and pharmaceutical care intervention of 90 patients was assessed. A Study conducted by Patrick et al [20] on classification of DRPs with new prescriptions using a modified PCNE classification system detected 141 clinical DRPs. The most frequent clinical DRPs were potential drug-drug interactions (37.6%), Drug choice (24.8%) and Drug use problems (15.6%) which was similar to our study were Drug selection was most (22.8%) followed by Drug use problems (15.4%) problems. A study conducted by A. Chandrakanth [21] it was observed that 250 patients were analysed 154 DRP were found in 52 patients and the most potential was drug interaction 55.79 followed by ADR 17.3%. A similar coinciding outcome was observed on a study conducted by Aziz Ullah Khan [22] a total of 37 patients 91 DRP were identified and the potential one was drug – drug interaction 48.7% an followed by inappropriate drug selection 33.75 and the intervention documented potential was drug information response 26.25%. Chronic disease management would be assumed to be most successful when care is given through collaborative of health care team members and patients and include patient education & monitoring Amura francessca fog et al [23] showed in a study conducted in Norway, a total of 6158 DRP was identified an average of 2.6 DRP /patients found in which use of unnecessary drug 43.5 % constitute the most.

The strength of the study can be enlisted as; the results observed in our study highlighted that the hefty fragment of the drug related problems was due to fluctuation of applied management from optimum pharmacotherapy. This fact stressed on the need of improvement in practitioner's awareness to follow

appropriate and optimum management for the patients which will improve their safety, therapeutic outcome and quality of life.

CONCLUSION

Pharmaceutical care is a systematic process designed to identify and resolve DRP's and individualized the pharmacotherapy, documentation and achieve economical, clinical and humanistic outcomes which respecting sovereign confidentially of the patients by committed pharmacist. Drug-related problems are common among the OLD patients. Untreated indication and unnecessary drug therapy were the most common types of DRPs among OLD patients identified in our study.

CONFLICT OF INTEREST
No interest

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