



A PROSPECTIVE STUDY ON PRESCRIBING PATTERN OF DRUGS IN CHRONIC OBSTRUCTIVE PULMONARY DISEASE AND ASTHMA IN A TERTIARY CARE HOSPITAL

Devika Chandran^{1*}, Anisha R¹, Rushda S¹, Thangamani S¹, Jesin Kumar C²

¹Department of Pharmacy Practice, Grace College of Pharmacy, Palakkad-678004, Kerala, India.

²Department of, Karuna Medical College Hospital, Vilayodi, Chittur, Palakkad-678103, Kerala, India

ABSTRACT

Asthma and COPD are the most commonly occurring respiratory diseases. Prescribing pattern are the drug utilization studies that provides insight about pattern of drug use, quality, determinants, and outcome of drug use. Irrational prescribing pattern is one of the major problems faced by healthcare. It can negatively impact health and economy for the patient as well as society. The study aimed to evaluate the prescribing pattern of drugs used in Bronchial asthma and COPD patients. A Prospective observational study was conducted in 80 patients (65 Asthma and 64 COPD respectively). The prescribing pattern of drugs in Asthma and COPD was evaluated and relevant data were collected from the patients. In 80 prescriptions majority patients were males (42.1%) in Asthma, 76.1% in COPD and 11% were females in Asthma. Asthma patients have longer duration of disease when compared with COPD patients. For Asthma patients, 19 were prescribed antibiotics with Azithromycin being the highest at 15.7%, Ceftriaxone 10.5%, and Penicillin 2.6%. Inhaled SABA was prescribed more for COPD patients (33.3%) than for Asthma patients (23.6%). In case of LABA Formoterol was prescribed most in both Asthma and COPD (78.9% and 50% respectively). The overall utilization of drugs used in Asthma and COPD was found to be: Antibiotics 29.2% in Asthma and 25 % in COPD, Anticholinergics 4.6% in Asthma and 25% in COPD, SABA 13.8% in Asthma and 29.6% in COPD, LABA 60% in Asthma and 31.2% in COPD and Steroids 55.3% in Asthma whereas 39.06% in COPD respectively.

Key words: Antibiotics, Asthma, Chronic Obstructive Pulmonary Disease (COPD), Drug Utilization Evaluation (DUE), Prescribing Pattern.

INTRODUCTION

Asthma is a disease of airway inflammation and airway obstruction characterized by the presence of intermittent symptoms including wheezing, chest tightness, dyspnea, and cough together with bronchial hyperresponsiveness [1]. Chronic obstructive pulmonary disease (COPD) is a common, preventable, and treatable condition characterized by persistent airway obstruction that is usually progressive and associated with an enhanced chronic inflammatory response in the airways and the lung to noxious particles or gases [2]. Recently, the Indian study on Epidemiology of Asthma, Respiratory symptoms, and Chronic Bronchitis in Adults showed the overall

prevalence of COPD as 14.84 million and that of asthma as 13 million patients [3]. Nowadays all over the world, inappropriate/irrational prescribing pattern is a significant problem of healthcare delivery and it has a negative impact on health and economy of both individuals and society, leading to wastage of resources and widespread health hazards [4]. Surveys indicate that the majority of patients in developed and developing countries do not receive optimal care, and therefore, are not well controlled [5].

Corresponding Author: -. Devika Chandran Email: devu.1481999@gmail.com

Prescribing pattern monitoring studies (PPMS) are drug utilization study which is a tool that mainly focuses on prescribing and administering drug [6]. The World Health Organization (WHO) addressed drug utilization as, the marketing, distribution, prescription, and use of drugs in society, considering its consequences, either medical, social and economic [7]. Drug utilization studies can provide insights into a pattern, quality, determinants and outcomes of drug use [8]. It provides useful insights into current prescribing practices and can thus help to reform and update practices in clinical medicine and pharmacotherapy [9]. Treatment protocols for asthma and COPD have undergone considerable changes over the past 5 decades [10]. Long-term treatment is generally required for effective management, which has an effect on the cost of the therapy and patient's compliance [11].

The Global Initiative for Asthma (GINA) guidelines and Global Initiative for Chronic Obstructive Pulmonary Disease (GOLD) guidelines are uniformly used for the treatment of COPD and Asthma, respectively. Short-acting β_2 agonists (SABA) and short-acting antimuscarinic agents (SAMA) are used for immediate relief and to induce bronchodilation. Inhaled corticosteroids are used as preventers in asthma while it has a limited role in COPD management [10, 12]

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 use [4]. The study was aimed to evaluate the prescribing pattern of drugs used in Bronchial asthma and COPD patients.

METHODOLOGY

It was a prospective observational study, conducted from November – February 2023 in the Pulmonology and General medicine department of KHMC, Palakkad, Kerala. Relevant data were collected from all patients as per the process. Relevant data were collected, including demographic data like age, gender, IP/OP number, date of admission, occupation, h/o smoking, education etc. Disease condition details like duration, co-existing diseases, frequency of symptoms etc and prescribed drug details such as dose, frequency, route of administration and duration.

RESULTS

A total of 80 patients, 38 were asthma patients (47.5%) and 42 were COPD patients (52.5%) who were included in the study. From these 42.1% were males with Asthma, 76.1% were males with COPD and 11% were females with asthma (Table 1). If the compare the residential area of the patients it was found that asthma cases were more in compared to COPD living in both rural area and in urban area (76.3% and 16.6%).

While looking into the duration of the disease, asthma patients had a longer duration of the disease when

compared with COPD patients, which is 7.8%, 68.4%, 38.5%, and 9.5% for the duration of 3 months, 2-15 years, 31-45 years, and 45 years respectively (Table 1). On comparing the frequency of disease, COPD patients had a higher frequency of disease on a daily and monthly basis, while asthma patients had a higher frequency on a weekly basis. COPD patients had more dust allergies in comparison with asthma patients, which is 59.55% (Table 1).

On comparing the risk factors such as occupation, smoking history, and COPD history of both asthma and COPD patients, it was found that COPD patients had higher risk factors when occupation was taken into consideration. 40.4% for COPD, 18.4% for asthma, and while considering other factors such as smoking history and COPD history, it was found that COPD patients were more smokers than compared to asthmatics (59.5% for COPD, 39.4% for asthma).

All 80 prescriptions for the subject contained more than three drugs. The prescription of more than three drugs for one patient may suggest the possibility of some patients presenting with an acute and chronic exacerbation of COPD and asthma that requires an antibiotic and a corticosteroid. All the patients were prescribed various classes of drugs, such as antibiotics, anticholinergics, antihistamines, short-acting beta-agonise, long-acting beta-agonise, inhaled steroids, systemic steroids, leukotriene receptor antagonists, and xanthines. For asthma patients, 19 were prescribed antibiotics, with azithromycin being the highest at 15.7%, followed by ceftriaxone at 10.5%, and penicillin at 2.6%; for COPD patients, 19% were prescribed azithromycin, followed by ciprofloxacin at 7.1%, and penicillin was not prescribed in any patients. In case of anticholinergics - tiotropium bromide was highest prescribed 5.2% in asthma and 28.5% in COPD patients while ipratropium bromide being least in both asthma and COPD patients (Table 2).

Inhaled SABA was prescribed more for COPD patients (33.3%) than for asthma patients (23.6%). In the case of LABA, formoterol was prescribed most often in both asthma and COPD patients (78.9% and 50%, respectively). Asthma and COPD patients were prescribed with both inhaled and systemic routes of steroids, of which Budesonide was prescribed most frequently in asthma and COPD patients, at 71.0% and 30.9%, respectively (Table 2). Leukotriene receptor antagonist (montelukast) was prescribed most often in asthma patients, which is 39.4%. Acebrophylline, theophylline, and doxophylline belonging to xanthines were prescribed in Patients diagnosed with asthma and COPD, in which theophylline was prescribed most often (21% in asthma and 30.9% in COPD) (Table 2). Several combinations of inhaled therapies have been used. The most commonly prescribed combination therapy for Asthma and COPD was Formoterol + Budesonide which was 28.9% and 52.3%. Combination of Ipratropium bromide with Levosalbutamol was found to be 15.7% in

Asthma and 4.7% in case of COPD (Table 5). Several other monotherapy and combination therapies are also used.

While evaluating the comorbidities, Hypertension along with Asthma is the most commonly occurred

comorbidity which is 23.6% and Asthma along with Diabetes 15.7% (Table 3). In case of COPD, the disease alone without any comorbidities are seen in most cases of 57.1% and COPD along with Tuberculosis 7.1% (Table 4).

Table:1 Baseline Characters of Study Population Parameters.

Parameters	Asthma (n= 38)	%	COPD (n= 42)	%
Gender				
Male	16	42.1	32	76.1
Female	21	55.2	26.1	11
Age Group (yrs)				
20-40	9	23.6	5	11.9
40-60	15	39.4	9	21.4
60-80	9	23.6	20	47.6
80-100	3	7.8	9	21.4
Residence				
Rural	29	76.3	36	85.7
Urban	9	23.6	7	16.6
Duration of disease				
3 months-1 yr	3	7.8	2	4.7
2-15 yrs	26	68.4	19	45.2
16-30 yrs	8	21.0	16	38.0
31-45 yrs	4	10.5	4	9.5
>45 yrs	2	5.2	1	2.3
Frequency of symptoms				
Daily	22	57.8	25	59.5
Weekly	5	13.1	3	7.1
Monthly	2	5.2	3	7.1
Seasonally/occasionally	7	18.4	9	21.4
Allergies				
No allergy	8	21.0	17	40.4
Cold/Dust	19	50	25	59.5
Smoke	4	10.5	3	7.1
Others	3	7.8	0	0
Occupation				
Business/Entrepreneur	7	18.4	6	40.4
Farmer	1	2.6	7	16.6
Driver	3	7.8	5	11.9
Unemployed	17	44.7	17	40.4
Others	10	26.3	8	19.0
Smoking History				
Smoker	15	39.4	25	59.5
Non smoker	23	60.5	18	42.8
Covid History				
Positive/Vaccinated	13	34.2	23	54.7
Positive/Not vaccinated	1	2.6	2	4.7
Negative/Vaccinated	16	42.1	12	28.5
Negative/Not vaccinated	2	5.2	5	11.9

Table 2. Prescribing pattern of Class of drugs in Asthma and COPD Patients.

Class of drugs	Drugs	No of Prescriptions in Asthma (n=38)	%	No of Prescriptions in COPD (n=42)	%
	Azithromycin	6	15.7	8	19.0

Antibiotics	Levofloxacin	3	7.8	2	4.7
	Doxycycline	5	13.1	2	4.7
	Ceftriaxone	4	10.5	1	2.3
	Ciprofloxacin	0	0	3	7.1
	Penicillin	1	2.6	0	0
Anticholinergics	Tiotropium Bromide	2	5.2	12	28.5
	Ipratropium Bromide	1	2.6	4	9.5
Antihistamines	Fexofenadine	10	26.3	1	2.3
	Levocetirizine	9	23.6	12	28.5
Short acting beta agonist (SABA)	Levosalbutamol (inhaled)	9	23.6	14	33.3
	Levosalbutamol (oral)	0	0	5	11.9
Long-acting beta agonist (LABA)	Formoterol	30	78.9	19	50
	Salmeterol	1	2.6	1	2.3
Inhaled steroids	Fluticasone	6	15.7	9	21.4
	Budesonide	27	71.0	13	30.9
Systemic Steroids	Methyl Prednisolone	3	7.8	1	2.3
	Dexamethasone	0	0	2	4.7
Leukotriene Receptor Antagonist	Montelukast	15	39.4	6	14.2
Xanthines	Acebrophylline	1	2.6	4	9.5
	Theophylline	8	21.0	14	30.9
	Doxophylline	8	21.0	9	21.4

Table 3. Distribution of Comorbid diseases among Asthma patients.

DISEASES	Total (n=42)	%
COPD Only	24	57.1
COPD + Post Tb	3	7.1
COPD + Pneumonia	1	2.3
COPD + Pneumonia + Hypertension	2	4.7
COPD + Pulmonary Atrial Hypertension + Interstitial Lung Disease	1	2.3
COPD + Pulmonary Atrial Hypertension + Coronary Artery Disease + Respiratory Failure	1	2.3
COPD+ Neuralgia	1	2.3
COPD + Migraine	1	2.3
COPD + Gastroesophageal Reflux Disease + Coronary Artery Disease	1	2.3
COPD + Gastroesophageal Reflux Disease + Hypertension	3	7.1
COPD + Hypertension + Coronary Artery Disease	2	4.7
COPD+ Benign Prostatic Hyperplasia	1	2.3
COPD + Benign Prostatic Hyperplasia + Coronary Artery Disease	1	2.3

Table 4. Distribution of Comorbid diseases among COPD Patients.

Diseases	Total (n=38)	%
Asthma Only	0	0
Asthma + Diabetes	6	15.7
Asthma + Diabetes + Hypertension	2	5.2
Asthma + Hypertension	9	23.6
Asthma + Gastroesophageal Reflux Disease	4	10.5
Asthma + Diabetes + Hypertension + Gastroesophageal Reflux Disease	1	2.6
Asthma + Gastroesophageal Reflux Disease + Benign Prostatic Hyperplasia	1	2.6
Asthma + Chronic Kidney Disease + Renal Failure	1	2.6
Asthma + Hernia	1	2.6
Asthma + Coronary Artery Disease + Hypertension	2	5.2

Asthma + Coronary Artery Disease + Diabetes	1	2.6
Asthma + Coronary Artery Disease	4	10.5
Asthma + Bronchiectasis	1	2.6
Asthma + Benign Prostatic Hyperplasia	1	2.6
Asthma + Acute Coronary Disease + Diabetes + Hypertension	1	2.6
Asthma + Benign Prostatic Hyperplasia + Hypertension	1	2.6
Asthma + Benign Prostatic Hyperplasia +Renal Failure	1	2.6
Asthma + Fibro bronchiectasis +Chronic Kidney Disease + Diabetes	1	2.6

Table 5. Combination of drugs used in Inhalers for Asthma and COPD Patients.

Combination of drugs used in Inhalers	No of Prescriptions	%
Asthma (n=38)		
Ipratropium bromide + Levosalbutamol	6	15.7
Tiotropium bromide	6	15.7
Ipratropium bromide	1	2.6
Budesonide	5	13.1
Formoterol + Budesonide	11	28.9
Budesonide + Salbutamol	1	2.6
Formoterol	1	2.6
Salmeterol + Fluticasone	2	5.2
Formoterol + Budesonide + Tiotropium bromide	1	2.6
Tiotropium bromide	3	7.8
Salbutamol	1	2.6
COPD (n=42)		
Ipratropium bromide + Levosalbutamol	2	4.7
Budesonide	6	14.2
Formoterol + Budesonide	22	52.3
Formoterol	1	2.3
Salmeterol + Fluticasone	6	14.2
Tiotropium bromide + Formoterol	2	4.7
Glycopyrrolate + Formoterol	1	2.3
Salbutamol	2	4.7

DISCUSSION

Patient with Asthma and COPD participated in a prospective interventional study to evaluate the prescribing pattern of drugs among study population. In this study, the majority of patients were between the 40 and 60 age group in the case of asthma, while for COPD, the distribution was between 60 and 80. 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 [13]. Females have higher occurrence of asthma than males because In males, testosterone was found to diminish TH2 response in splenic T cells, and this was abolished in case of males [14]. For COPD, the distraction of disease is more among males than females, due to the increased prevalence of smoking in males than females [15]. It was found that antibiotics were given all patients where Azithromycin is prescribed most in both asthma and COPD [3].

One of our key findings is that long-acting beta agonists were most commonly used in both asthma and COPD patients, among whom Formoterol was most

commonly prescribed in the study population. After LAMA, the most commonly prescribed medication among the study population is inhaled steroids, of which budesonide is prescribed most often to asthma patients. The fact that several medicines have complementary modes of action is one of the scientific arguments in favour of combination therapy. Airway smooth muscle is affected by long-acting 2-agonists (LABA), and inhaled corticosteroids have a strong anti-inflammatory effect on the skin [20].

It has been demonstrated that this combination significantly lowers exacerbations and ameliorates symptoms. Anticholinergics were also found to be prescribed frequently among the study population. Anticholinergic agents and SABAs, either alone or in combination, are the mainstay of treatment for COPD exacerbation [18].

Asthma and COPD benefit from the use of long-acting -agonists (LABAs) and inhaled steroids. Some asthma patients can benefit from the use of anticholinergics, but they appear to work best in COPD

patients [19]. Tiotropium may be the COPD medication that works best when used alone, but combining it with an inhaled steroid and a LABA may also help improve lung function in patients with respiratory problems [16]. In COPD, long-acting bronchodilators are useful as monotherapy; however, in asthma, they should be taken in combination with a controller drug [17]. In COPD, short-acting -agonists may be used frequently or in combination with an anticholinergic, while they should only be used occasionally in asthma [16].

CONCLUSION

The study concludes that the most of prescriptions prescribed was based on GOLD and GINA guidelines.

Many classes of drugs such as Antibiotics, anticholinergics, antihistamines, inhaled steroids and bronchodilators are prescribed. Several of them showed combination of drugs used in inhaled therapy for the effective treatment. Long-acting beta agonist (LABA) along with steroids is the most commonly used combination therapy. Antimicrobial therapy was given for all patients among the study population. Bronchodilators were the most commonly prescribed class among both Asthma and COPD. We argue that new approaches are required to develop a standardised method for treating COPD, aiming to increase adherence recommendations for using guidelines, focusing in particular on therapeutic indications and overtreatment.

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