ORIGINAL RESEARCH PAPER
Volume - 9 | Issue - 8 | August - 2020 | PRINT ISSN No. 2277 - 8179 | DOI : 10.36106/ijsr
INTERNATIONAL JOURNAL OF SCIENTIFIC RESEARCH

A PROSPECTIVE STUDY OF PRESCRIBING PATTERNS IN ASTHMA PATIENTS IN TERTIARY CARE HOSPITAL

Pharmacology

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ABSTRACT

Introduction : Bronchial asthma is a social and economic healthcare burden. Drug utilization studies are important tools to assess current prescription practices against standard guidelines and help in rationalizing the management. **Materials and Methods:** This prospective cross-sectional study was designed to evaluate the pattern of drug utilization in bronchial asthma patients in a government hospital of Amritsar. Prescribing information of patients of all ages and both sexes diagnosed with bronchial asthma being treated with at least one of the anti-asthmatic medications was utilized. Demographic details, brand/ generic name, route and frequency of the drug were recorded. Prescriptions were examined for order, number, and therapeutic class of drugs in addition to appropriateness. Patients having other respiratory disorders such as chronic obstructive pulmonary disorder (COPD), bronchitis, emphysema, or any comorbidity such as diabetes, hypertension, and peptic ulcer were excluded. **Results:** A total of 400 prescriptions were studied. Patients were aged from 4 months to 75 years, with 55% males and 45% females. Bronchodilators followed by steroids were themost common drug groups. Salbutamol and budesonide were the most common from each group, respectively. 82.5% of the patients were having at least two drugs. Number of drugs per prescription were 3.16. 63.75% drugs were administered by inhalational route and 32.5% by oral route. 75% prescriptions were found to be appropriate. **Conclusion:** Prescription pattern was mainly in accordance with standard guidelines with some knowledge and technical gaps in prescription writing methodology.

KEYWORDS

prescribing pattern, antiasthmatic drug, drug utilization, route of administration, drug therapy, salbutamol, budesonide.

INTRODUCTION

Asthma is a chronic inflammatory disorder of the airways. It is characterized by airway hyper responsiveness that leads to recurrent episodes of wheezing, breathlessness, chest tightness and coughing particularly at night or in the early morning.[1] It is thought to be caused by a combination of genetic and environmental factors.[2,3] Its diagnosis is usually made based on the pattern of symptoms and/or response to therapy over time and pulmonary function test.[4] The current asthma management guidelines from the National Asthma Education and Prevention Program (NAEPP) Expert Panel of the National Institutes of Health (National Heart, Lung, and Blood Institute) recommend stepwise approach to asthma management.[5] Drug classes commonly used to treat asthma include short-acting and long acting beta agonists, anticholinergics, inhaled corticosteroids used for symptom prevention and disease control; and oral corticosteroids, which are used during episodes of more severe asthma.[6] Patients of asthma require lifelong treatment and multiple anti-asthmatic drugs at same time. Despite the availability of all these drugs, which are recommended for the treatment, not every patient achieves complete control of the disease. One of the possible reasons behind this could be, deviations from recommended guidelines for treatment.[7]

According to Global initiative for asthma (GINA) guidelines, inhalation therapy should be the first choice of treatment for bronchial asthma.[8,9] Poor compliance of the patients, which could be due to adverse effects leading to under-treatment and hence poor control and further progression of the disease.[9,10]

Drug utilization studies aim at evaluation of appropriateness of drug therapy. WHO defines the as "marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences. "[11] The WHO[12] emphasized the use of drug utilization studies as a management tool in healthcare infrastructure as well as a measuring tool to assess the outcome of a therapeutic intervention. This study intends to evaluate the drug utilization patterns of anti-asthmatic drugs in asthmatic patients and to evaluate whether the drug utilization pattern is deviated or in accordance with international guidelines for management of asthma.Though rational prescribing of drugs can be improved by proper training of target population, but there is paucity of such data in our country, hence this study was planned to monitor prescription pattern in patients diagnosed as cases of bronchial asthma, attending Out Patient Department (OPD) of respiratory medicine of a tertiary hospital.

MATERIALAND METHODS

Study design: prospective study.

Inclusion criteria: Patients of all ages and both sexes diagnosed with bronchial asthma being treated with at least any one of the anti-asthmatic medications at department of pulmonary medicine in Guru Nanak Dev hospital attached to GMC Amritsar

Exclusion criteria: Patients having other respiratory disorders like COPD, bronchitis, emphysema or any comorbidities such as diabetes, hypertension, peptic ulcer, etc.

The study duration was 3 months. 400 prescriptions of patients who visited the department of pulmonary medicine in Guru Nanak Dev hospital attached to GMC Amritsar from January 2020 to March 2020 were included in the study. In addition to patient demographic details, the following details of each prescribed drug were noted: (1) name (brand/generic), (2) class of drug, (3) name of drugs , (4) type of drug therapy,(5) frequency of prescribing and (6) route of administration of drugs. The prescriptions were examined for appropriateness .The prescriptions were classified as "appropriate" when the prescribed drugs have full relationship to diagnosis, "partially appropriate" when the drugs are partially related to diagnosis, "inappropriate" when there is no relationship between the prescribed drugs and the diagnosis, and "difficult to comment" when either the diagnosis is missing or the prescription not written clearly. Classes of antiasthmatic drugs used for treating patients were short acting beta agonists, anticholinergics, methylxanthines, steroids and long acting beta agonists, leukotriene modifiers, antihistaminics, mucolytics and miscellaneous (antibiotics, antipyretics and analgesics). Short acting beta agonist used was salbutamol, anticholinergic used was ipratropium, methylxanthine used was theophylline, steroids used were fluticasone and budesonide, long acting beta agonists used were formoterol and salmeterol, leukotriene modifier used was montelukast , antihistaminic used was loratadine, mucolytic used was ambroxal , antibiotics used were azithromycin and doxycycline, antipyretic used was paracetamol and analgesic used was nimuselide.

Statistical analysis : Descriptive analysis was done in which the number of prescriptions were calculated in the form of percentages.

RESULTS

Table 1 : Gender details of patients enrolled in study

Gender	Percentage (%)
Males	55
Females	45

Table 2: Age details of patients enrolled in study

Age group (years)	Percentage (%)
0-20	45
21-40	20

41-60	20
>60	15
Total	100

Table 3 : Classes of antiasthmatic drugs along with their names prescribed in patients enrolled in stud160y

Class of antiasthmatic drug	Name of drugs
Short acting Beta agonists	Salbutamol
Anticholinergic drugs	Ipratropium bromide
Methylxanthines	Theophylline
Steroids	Budesonide Fluticasone
Steroids + long acting beta agonists	Budesonide + formoterol Fluticasone+ salmeterol
Leukotreine modifiers	Montelukast
Antihistaminics	Loratadine
Mucolytics	Ambroxal
Miscellaneous (antibiotics, antipyretics and analgesics)	Azithromycin Doxycycline Paracetamol Nimuselide

Table 4 : Percentage of prescriptions of antiasthmatic drugs prescribed in patients enrolled in study

Class of antiasthmatic drug	Name of drugs	Number of prescriptions (percentage)
Short acting Beta agonists	Salbutamol	90 (22.5%)
Anticholinergic drugs	Ipratropium bromide	35 (8.75%)
Methylxanthines	Theophylline	25 (6.25%)
Steroids	Budesonide Fluticasone	40 (10%) 40 (10%)
Steroids + long acting beta agonists	Budesonide + formoterol Fluticasone+ salmeterol	30 (7.5%) 20 (5%)
Leukotreine modifiers	Montelukast	25 (6.25%)
Antihistaminics	Loratadine	30 (7.5%)
Mucolytics	Ambroxal	15 (3.75%)
Miscellaneous (antibiotics, antipyretics and analgesics)	Azithromycin Doxycycline Paracetamol Nimesulide	15 (3.75%) 15 (3.75%) 10 (2.5%) 10 (2.5%)

Table 5: Percentage of drug therapy type in asthmatic patients enrolled in study

Type of drug therapy	Class of drugs	Number of prescriptions (Percentage)
Single (total)		70 (17.5%)
	beta agonists	40 (10%)
	Steroids	30 (7.5%)
Combination (total)		330 (82.5%)
	Anticholinergic drugs	35 (8.75%)
	Methylxanthines	25 (6.25%)
	Steroids + beta agonists	150 (37.5%)
	Leukotreine modifiers	25 (6.25%)
	Antihistaminics	30 (7.5%)
	Mucolytics	15 (3.75%)
	Miscellaneous (antibiotics, antipyretics and analgesics)	50 (12.5%)

Table 6: Percentage of drugs given by different route of administration

Route of administration	Number of prescriptions (percentage)
Inhalational	255 (63.75%)
Oral	130 (32.5%)
Syrup	15 (3.75%)

Table 7: Percentage of prescriptions according to appropriateness of prescriptions

Appropriateness	Percentage
Appropriate	75%
Partially appropriate	15%
Difficult to comment	10%

A total of 400 prescriptions were studied. The age range was from 4 months to 75 years. Table 1 and 2 shows the demographic characteristics of the studied population. There were 55% males and 45% females. Percentage of patients in the age group of 0-20 years was 45%, in 21-40 years was 20%, in 41-60 years was 20% and > 60 years was 15%. Table 3 shows the different classes of drugs along with their names used in study population. Table 4 shows the prescription pattern of antiasthmatic drugs. When analyzed according to the percentage of prescriptions containing a particular drug or combination, most common individual drug category present in the maximum number of prescriptions were bronchodilators, of which salbutamol (beta-agonist) in the inhalational form was the most common followed by ipratropium (anticholinergic). 22.5% prescriptions were found to contain salbutamol. The next most prescribed class of drugs was steroid that is budesonide and fluticasone present in 10% each of the prescriptions. This is followed by combination of steroids and long acting beta agonists (budesonide and formoterol (7.5%) and fluticasone and salmeterol (5%)). This is followed by antihistaminic (loratadine) which is 6.25% and leukoteine modifier(montelukast) which is 5%. As depicted in Table 5 , most of the patients (82.5%) were given a combination therapy, whereas only 17.5% patients received a single drug. Table 6 shows the percentage of route of drug administration. Inhalational route was the most common (63.75%) followed by oral route (32.5%), whereas syrup was given only in a minority of patients. Table 7 shows the appropriateness of prescriptions. 75% prescriptions were appropriate, 15% were partially appropriate, and 10% were "difficult to comment" (diagnosis missing). In general, the treatment prescribed were having SABA, LABA, ICS, etc., as advocated in GINA document and were in accordance with GINA guidelines. All the drugs were prescribed in their brand names.

DISCUSSION

Drug utilization studies are an important tool to assess the current therapeutic practices and serve as a background for modification and rationalization of disease management to decrease economic and social healthcare burden. In general, the treatment prescribed were having SABA, LABA, ICS, etc., as advocated in GINA document and were in accordance with GINA guidelines.

In another study, there are also well established reports concerning the superiority of combination of Inhalational Corticosteroids (henceforth ICS) and Long Acting Beta Agonist (hereafter LABA) against individual therapy. A study in Brazil concluded that a combination of budesonide + salbutamol is better than oral prednisolone.[13] Cochrane review database also supports these reports.[14,15] Recently introduced SMART (Single Inhaler Maintenance And Reliever Therapy) or SiT (Single Inhaler Therapy) approach has produced good results regarding the quality of life and dose reduction of both ICS and LABA as compared to ICS alone,[16,17] however, there are few incidences of flare ups in children; hence, a controversy is ongoing regarding the long-term benefits, especially in pediatric age group.[18] Our results indicated that a small fraction of patients were prescribed montelukast, a leukotriene receptor antagonist as compared to other previous studies. It may be partially explained by a better asthma control with already prescribed ICS and SABA. Another reason may be a slightly higher cost. Montelukast improves PEF, FEV1, and other parameters, reduces nocturnal symptoms, and may decrease the concomitant doses of ICS and SABA/LABA.[19] Antihistamines, expectorants, and mucolytics were not so much prescribed. Average drugs per prescription was 3.16. Further, most of the patients (82.5%) were on ≥2 drugs which are required for better control of asthma. Inhalational route is the choice for asthmatic patients as it delivers the maximum amount of drug with minimal systemic side effects. A previous study showed similar more specifically salbutamol, making it the preferred choice for asthma management. This finding is further reinforced by some previous studies in other countries.[20,21] It is from the group Short Acting Beta Agonist , and the main reason for its use is rapid onset and low cost. Anticholinergics were present in 8.75% of the prescriptions There is some benefit when they are used in combination with SABA. Furthermore, the side effects of anticholinergic such as dryness of mouth and urinary retention may further limit their use.[22-24] Methylxanthines are also less preferred (6.25%). A previous study in Malaysia also revealed similar figure for methylxanthines use.[25] In our study, steroid consist the second largest prescribed drugs. This finding is reinforced by a similar study from India.[26] Corticosteroids are one of the mainstay therapies for asthma. In addition to reduction of severity and exacerbation, they reduce airway hyperresponsiveness.

They also help in reducing inflammation by inhibiting the activation and recruitment of T cells, macrophages, and dendritic cells, by decreasing mast cells survival, and by inhibiting the release of inflammatory mediators.[27] A recent systematic review established the myriad benefits of systemic steroids in the management of asthma.[28] Budesonide has shown better pharmacological profile as compared to prednisolone,[29] however, prednisolone is cheap and available for oral administration. Another study documented the preference of budesonide over prednisolone in pediatric acute moderate asthmatic attacks.[30]

Concerning the prescription appropriateness, majority (75%) were appropriate. Even some from the "difficult to comment" category may be appropriate but the diagnosis was missing. Partially appropriate prescriptions were mainly those having miscellaneous drugs for symptomatic treatment like antibiotics, antipyretics, and analgesics. Moreover, dosage schedule, duration, proper address, and legible writing were some other issues.

CONCLUSION

Our study revealed that prescription pattern is mainly in accordance with standard guidelines. Physicians seem to be aware of recent guidelines in the management of asthma.However, there are some knowledge and technical gaps in prescription writing methodology such as dosage schedule, duration, patient particulars, and legible writing. This study may be more meaningful to improve, further, the prescribing through successful implementation of interventional program in the health care centers.

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