

Prescribing pattern in patients of asthma visiting outpatient departments of a tertiary care hospital: a cross-sectional, observational study

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Received: 04 January 2017

Accepted: 03 February 2017

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ABSTRACT

Background: Objective of the study was to evaluate the prescribing pattern in patients of asthma visiting outpatient departments.

Methods: Collected prescriptions were analyzed for demographic variables, proportions of various comorbid conditions, average number of drugs per prescription, average number of anti-asthmatic drugs per prescription, proportion of prescription with antibiotics, fixed dose combinations, and generic/brand names, proportion of formulations utilized, proportion of concomitant medications and possible drug interactions, average cost per prescription, average cost of antiasthmatic drugs per prescription, proportion of irrational prescription and adverse drug reactions.

Results: Total 139 prescriptions were evaluated. Deriphyllin was the most commonly prescribed anti-asthmatic drug followed by beta agonist- steroid combination. Majority drugs were prescribed by inhalational route. Deriphyllin, and dexamethasone were prescribed by oral route and salbutamol was by both oral and inhalational route of administration. Antibiotics were prescribed to 24 patients. Possible drug interaction with deriphyllin was found in 15 prescriptions. Average cost per prescription was Rs. 193.4 (95%CI: 171.6-215.3).

Conclusions: Prescribing pattern of asthma in our hospital shows more use of anti-asthmatic drugs. Standard treatment guideline should be followed. Role of methylxanthine in long term management of asthma should be justified.

Keywords: Bronchial asthma, Fixed dose combinations, Prescription audit, Poly-pharmacy

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. These episodes are usually associated with widespread, but variable airflow obstruction within the lung that is often reversible either spontaneously or with treatment.¹ The prevalence of asthma has increased significantly since the 1970s. As of 2010, 300 million people were affected worldwide and 3-5% pediatric population of India is affected by asthma.² In 2009 asthma caused 250,000

deaths globally.¹ It is thought to be caused by a combination of genetic and environmental factors.^{3,4} Its diagnosis is usually made based on the pattern of symptoms and/or response to therapy over time and pulmonary function test.⁵ Long term treatment is generally required for an effective management, which has effect on the cost of the therapy and patient's compliance.² 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.⁶ 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.⁷ Patients of asthma require lifelong treatment and multiple anti-asthmatic drugs at same time. Moreover, presence of other co-morbidities leads to use of drugs from other classes which may affect the prescription pattern in asthmatic patients.

METHODS

This cross-sectional study was carried out in outpatient departments of Paediatrics and Pulmonary Medicine of Sir Takhtsinhji General Hospital, Bhavnagar, Gujarat, India. The permission from Institutional Review Board was taken and verbal consent was obtained from the patients for taking photograph of their prescription. Photographs of OPD case paper was taken for all the asthmatic patients by investigator between June and August, 2012. Prescribers were not informed about the study. Data from photographed prescription were collected in coded case record form for demographic information, diagnosis, drug history, smoking history, co-morbid conditions, drugs prescribed for asthma along with their name; dose; dosage strength; route of administration; frequency of administration; and duration of therapy, concomitant medications, investigations related to diagnosis or monitoring of therapy if mentioned, non pharmacological measures, and adverse drug reaction, if any.

Data were analyzed for demographic variables, proportions of patients having positive history of smoking/allergy, proportions of various comorbid conditions, average number of drugs per prescription, average number of anti-asthmatic drugs per prescription, proportion of prescription with antibiotics, fixed dose combinations, and generic/brand names, proportion of formulations utilized, proportion of concomitant medications and possible drug interactions, average cost per prescription, average cost of antiasthmatic drugs per prescription, proportion of irrational prescription and adverse drug reactions. Incompleteness of prescription was evaluated by prescription with short forms used; and prescriptions without dose, frequency of administration, duration of treatment and nonpharmacological measures. Cost per prescription was analyzed in respect to prescribed generic or branded drugs.

The cost of individual drugs and fixed dose combinations was obtained from hospital formulary and Indian Drug Review (IDR) for generic and brand names, respectively.

RESULTS

We evaluated 139 prescriptions of asthma patients attending outpatient department of Pulmonary Medicine and Pediatrics, respectively between June 2012 and August 2012 at our tertiary care hospital.

Table 1: Prescribing pattern of anti-asthmatic drugs in patients of asthma attending out-patient department of our tertiary care hospital.

Drugs	Therapeutic class	Route of administration	Number of prescriptions
Deriphyllin	Methylxanthine	Oral	130 (93.5%)
Formoterol+Steroid combination	Long acting beta2 agonist+ glucocorticoid	Inhalation	58 (41.7%)
Salbutamol	Short acting beta2 agonist	Oral	28 (20.1%)
		Inhalation	21 (15.1%)
		Oral + Inhalation both	03 (2.15%)
Salbutamol+Steroid combination	Short acting beta2 agonist+ glucocorticoid	Inhalation	41 (29.5%)
Salmeterol+Steroid combination	Long acting beta2 agonist+ glucocorticoid	Inhalation	13 (9.35%)
Ipratropium bromide + Salbutamol	Anticholinergic + Short acting beta2 agonist	Inhalation	14 (10.05%)
Beclomethasone	Glucocorticoid	Inhalation	12 (8.6%)
Budesonide	Glucocorticoid	Inhalation	9 (6.5%)
Fluticasone	Glucocorticoid	Inhalation	5 (3.6%)
Formeterol	Long acting beta2 agonist	Inhalation	1 (0.7%)
Dexamethasone	Glucocorticoid	Oral	1 (0.7%)

Demographic variables

Mean age of patients was 39.8 years (95% CI: 37.3-42.3). 88 (63.3%) prescriptions were to female patients and

51(36.7%) to male patients. Smoking history was noted positive in 8 (5.75%) prescriptions, whereas 131(94.25%) prescriptions were without this detail. Drug history for asthma was not mentioned in all the prescriptions

whereas; history of drug therapy for tuberculosis was mentioned in 6 (4.3%) prescriptions. History of allergic reaction was mentioned in a single prescription. Associated co-morbidities were noted in 34 (24.5%) prescriptions. Hypertension (11.5%) was the commonest co-morbidity followed by diabetes mellitus (7.2%) and tuberculosis (4.3%).

Prescribing pattern

Total 660 drugs were prescribed in 139 prescriptions. 33 different types of drugs were prescribed for asthma as well as for associated co-morbidities and adjunctive medicines. Average number of drugs prescribed per patient was 4.75 (95% CI: 4.5-5.0). 134 (96.4%) prescriptions were containing both generic and brand drugs whereas 5 (3.6%) prescriptions were with only generic name.

11 different anti-asthmatic drugs were prescribed. Among these, 9 drugs were prescribed by inhalational route and 2 drugs by oral route and 1 drug with both inhalational and oral route of administration. Average number of anti-asthmatic drugs per prescription was 2.4 (95% CI: 2.3-2.5). Fixed dose combinations for asthma were prescribed to 134 (96.4%) patients. Leukotriene antagonists and mast cell stabilizers were not found in any prescription. Prescribing pattern of anti-asthmatic and other drugs are shown in Table 1 and Table 2.

24 (17.3%) prescriptions were containing antibiotics and doxycycline was the most commonly prescribed antibiotic (14 prescriptions) followed by azithromycin (4 prescriptions). Drug interactions were found among 15 (10.8%) prescriptions.

All the drug interactions were found with deriphyllin. Table 3 shows the possible drug interactions and its impact on the therapy. Non- pharmacological measures were missing in all the prescriptions where as, 35.5%, 28.8%, 8.6% and 2.2% prescriptions were with short

form, without dose, frequency of administration and duration of treatment, respectively.

Cost of drugs

Average cost of drugs per prescription was Rs. 193.4 (95% CI: 171.6-215.3). Contributions of anti-asthmatic drugs, antibiotics and other drugs in cost of treatment were 84.5, 12.4 and 3.1%, respectively. Distributions of cost due to use of brand and generic name were 72 and 28%, respectively.

Table 2: Other drugs prescribed along with anti-asthmatic medications.

Drugs	Therapeutic class	Number of prescriptions
Chlorpheniramine	Anti-histaminic	105 (75.5%)
Famotidine	H ₂ blocker	80 (57.6%)
Omeprazole	Proton pump inhibitor	21(15.1%)
Multivitamin	Vitamin supplements	53 (38.1%)
Iron + Folic acid	Haematinics	5 (3.6%)
Cetirizine	Anti-histaminic	8 (5.75%)
Codeine	Anti-tussive	1(0.7%)
Diclofenac	NSAIDs	8 (5.75%)
Domperidone	Anti-emetic	1(0.7%)
Enalapril	ACE inhibitors	1(0.7%)
Amlodipine	Calcium channel blocker	3 (2.1%)
Glipizide	Oral hypoglycemic	1 (0.7%)
Metformin	Oral hypoglycemic	1 (0.7%)
Furosemide	Diuretics	2 (1.4%)
Paracetamol	NSAIDs	3 (2.1%)
Vitamin C	Vitamin supplements	10 (7.2%)

Table 3: Possible drug interactions found in prescriptions.

	Interactions with	No. of prescriptions	Possible effect
Deriphyllin	Smoking	5 (3.6%)	Decrease plasma level of deriphyllin
	Anti-TB (Rifampicin)	3 (2.1%)	Decrease plasma level of deriphyllin
	Anti-TB (Rifampicin) + Smoking	2 (1.4%)	Decrease plasma level of deriphyllin
	Furosemide	2 (1.4%)	Enhanced effect of furosemide
	Hypoglycemic	3 (2.1%)	Enhanced risk of hypoglycemia

DISCUSSION

We evaluated prescribing pattern of drugs for patients of asthma in our hospital by prescription audit approach.

Prescription audit is one of the scientific method to judge the rationality of the prescriptions.² Total 139

prescriptions were evaluated in duration of two months. More female patients were suffering from asthma in our study as compared to male patients in other studies.^{2,8} Majority patients were from age group of 13-64 years. Hypertension, diabetes mellitus, tuberculosis and allergic rhinitis were the common comorbidities noted. Patients of asthma require lifelong therapy. These co-morbidities

may have impact on anti-asthma therapy by increasing number of drugs consumed by the patients, increasing chances of drug interaction and increasing cost of therapy. Smoking history is important as it is one of the risk factors for the asthma.

It was missing in most of the cases. It also decreases plasma level of theophylline and interferes with post therapy symptomatic improvement.⁹ In our study, all patients received multidrug therapy for asthma. Deriphyllin was the most commonly prescribed drug in our study as compared to beta agonist in other studies.^[2,10] Some studies show the methylxanthine as commonly utilized group.^{8,11} The probable reason for this may be the continuous hospital supply and low cost. Due to narrow therapeutic window and chances of drug interactions, incidence of adverse drug reactions increases. Limited data is available for role of long term deriphyllin therapy for asthma. According to guidelines, inhaled drugs should be the first choice of drug.⁶ Majority patients received inhaled beta agonist and steroid combinations for the treatment of asthma. Use of beta agonist and steroid relieves as well as controls the symptoms of asthma. 3 patients received oral and inhaled salbutamol at a time.

The use of both oral and inhaled steroids in patients of asthma seems irrational. The steroids are used as controller medicines and in inhaled form. Only 1 patient received systemic steroid therapy. Long term use of steroid therapy produces various side effects. Use of inhaled steroids shows awareness of prescribers. Uses of antibiotics were restricted to 24 prescriptions. Antibiotics are not required in treatment of asthma till the bacterial infection occurs. Chlorpheniramine, famotidine, multivitamins were the common concomitant medications prescribed. With use of inhaled therapy, majority patients do not require famotidine. Deriphyllin was prescribed in majority patients who can cause gastric irritation. However, use of famotidine and proton pump inhibitors in patients without history of peptic ulcer is irrational. History of allergy was noted in 1 prescription only. Use of chlorpheniramine in majority of the patients without knowing history of allergic reaction seems irrational. The use of multiple antiasthmatic drugs and concomitant medicines are responsible for higher number of drugs per prescriptions. The use of unnecessary drugs decreases patient compliance and increases ADRs and cost of treatment. We found possible drug interaction in 15 prescriptions and all with deriphyllin. It was with the treatment used for the co-morbid condition. Previous drug history is important for writing prescription for current illness to avoid drug interactions. The drug interactions should be kept in mind while prescribing particularly with the drugs having narrow therapeutic index. Non-pharmacological measures are important part of the prescription. It should be mentioned in case papers. Use of short forms of drugs, missing doses, frequency of administration and duration of therapy are the common problems during writing a prescription. Heavy patient

load in tertiary care hospital may be responsible for poor prescription writing habit. Prescribers need to make aware on all these issues while writing a prescription. Only 5% prescriptions were having generic names. Being tertiary care teaching hospital, use of generic name should be promoted. Average cost per prescription was higher. It is related with the high cost of beta agonist and steroid combinations prescribed by brand names. Even, concomitant medicines have contributed 13% cost in the prescription. Use of generic name and avoiding unnecessary drugs can help in reducing the cost of prescription. ADRs were not documented in single prescriptions. Prescribers should be made aware to note down the ADRs in prescription of the patient.

CONCLUSION

Prescribing pattern of asthma in our hospital shows more use of anti-asthmatic drugs. Standard treatment guideline should be followed. Role of methylxanthine in long term management of asthma should be justified by conducting comparative studies.

ACKNOWLEDGMENTS

Authors are sincerely thankful to Indian Council of Medical Research, New Delhi for selecting this project as a part of Short Term Studentship Program 2012 and providing scholarship to the student.

Funding: No funding sources

Conflict of interest: None declared

Ethical approval: The study was approved by the Institutional Ethics Committee

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Cite this article as: Trivedi N, Acharya HR, Barvaliya MJ, Tripathi CB. Prescribing pattern in patients of asthma visiting outpatient departments of a tertiary care hospital: a cross-sectional, observational study. *Int J Basic Clin Pharmacol* 2017;6:587-91.