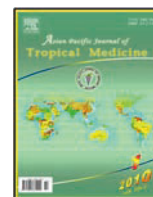




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# A study on utilization of anti-asthmatic drugs at a medical college hospital in India

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### ABSTRACT

**Objective:** To study the usage of anti-asthmatic drugs and enumerate the patients' non-compliance. **Methods:** The study was conducted from 5th Feb, 2006 to 5th Mar, 2006. The samples were from the general medicine ward. All patients with respiratory tract infection who received anti-asthmatic drugs were included in the study. Data were collected from clinical notes and structured patient's data, and patient interview utilizing a piloted questionnaire data collection form. The questionnaire included patient demographics, anti-asthmatics prescribed, dose, frequency and previous treatment if any and its duration, concomitant medications etc. **Results:** 26.31% of patients were 61–70 years old. Among 57 patients, 91.23% of patients received multi-therapy, 8.77% of patients received mono-therapy, 59.65% of patients took over the counter (OTC) drugs and 57.89% of patients were non compliant. Anti-asthmatic drugs were prescribed to asthmatic patients as oral, inhalation and others (injections), and more than one route were used for administration of drugs. **Conclusion:** The anti-asthmatics are used to treat breathing difficulties such as allergy. Poor compliance to treatment is common among the patients, which makes it difficult to manage asthma and increases both morbidity and mortality. It is suggested that interventions have to be done by providing counseling and improving the current prescribing trend for better and rational utilization.

## 1. Introduction

Drug utilization studies aim to evaluate factors related to the prescribing, dispensing, administering and taking of medication, and its associated events (either beneficial or adverse). Since early 1960's, the interest in drug utilization studies has increased in evaluating the prescription pattern quality of medical prescription, comparing use of specific drugs and studying the prescribing habits of physicians. Presently drug utilization studies are an evolving area. Their scope is to evaluate the present state and future trends of drug usage, to estimate disease prevalence, drug expenditures, appropriateness of prescriptions and adherence to evidence-based recommendations. The importance of drug utilization studies increases as bridging with other health related areas, such as public health, pharmacovigilance, pharmacoconomics, eco-pharmacovigilance and pharmacogenetics.

The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its medical, social, and economic consequences. Studies on drug utilization focus on the factors related to the prescribing, dispensing, administering of medication and its associated beneficial or adverse effects[1,2]. The therapeutic practice is expected to be primarily based on evidence provided by pre marketing clinical trials, and complementary data from post marketing period are also needed to provide an adequate basis for improving drug therapy[3].

The interest in drug utilization studies began on both sides of the Atlantic in the early 1960s, and is still increasing[4,5]. The first investigations were conducted mostly for marketing purposes[3,6,7]. Importance of drug utilization studies increases due to the boost in the marketing of new drugs and concern about their advertisement effects, wide variations in prescribing patterns, growing concern regarding costs of drugs, and increase in volume of prescription, etc[8–11].

In the United States, drug utilization research has been primarily developed at an institutional level or as part

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of as local health programs. Initially numbers of studies were conducted with the quality of prescribing habits of physicians, in particular with respect to antibiotics, in both inpatients and outpatients<sup>[6,7,12]</sup>. The European drug utilization studies have been predominantly quantitative, describing and comparing using patterns of specific drug groups according to geographic regions and time, showing wide variations in the utilization of drugs pertaining to several pharmaceutical classes, such as anti-diabetics<sup>[13]</sup>, psychotropics, nonsteroidal anti-inflammatory drugs (NSAIDs)<sup>[14]</sup>, antihypertensive drugs, antibiotic drugs<sup>[10]</sup> and lipid-lowering drugs<sup>[15]</sup>.

Asthma is a chronic disease of the airways characterized by exacerbations of significant bronchospasm and marked airway inflammation. It is the most common chronic disease in childhood, affecting nearly five million children<sup>[16]</sup>. Asthma prevalence varies with age, ethnicity, socioeconomic status, and urban dwelling<sup>[17]</sup>. Few studies have been published in which retrospective data were used along a longitudinal time frame to assess the prescription and anti-asthmatic drugs utilization continuously in patients with asthma<sup>[18–21]</sup>. The purpose of this study is to explore the use of anti-asthmatics, drug interactions, adverse drug effects (if any), the patients' non-compliance (if any) and to provide proper counseling.

## 2. Materials and methods

The study was conducted from 5th Feb, 2006 to 5th Mar, 2006, and the samples were from the general medicine ward. All patients who received anti-asthmatic drugs were included in the study. Data were collected from clinical notes and structured patient's data, and patient interview utilizing a piloted questionnaire. The questionnaire included patient demographics, anti-asthmatics prescribed, dose, frequency and previous treatment if any and its duration. Concomitant medications were also documented.

The combinations of medications were based on guidelines developed in 1989 by a Canadian consensus group. These guidelines involve four levels as following:

Level 1: Inhaled  $\beta_2$ -agonist as needed +/- cromoglycate;

Level 2: Level 1+maintenance treatment with cromoglycate or low-dose level of inhaled corticosteroid;

Level 3: Level 1+maintenance treatment with higher dose inhaled corticosteroid trial with a long action theophylline or a long acting  $\beta_2$  agonist as adjunct treatment +/- inhaled ipratropium;

Level 4: Level 3+oral prednisone.

## 3. Results

Fifty seven inpatients from the general ward were included in the study including 35 males and 22 females. Among these patients, 26.31% of patients prescribed with anti-asthmatic drugs were in the age group of 61–70, in which 37.14% were males and 9.09% were females. Thirteen patients (age > 65) were geriatric including 11 males and 2 females.

The patients who received only one anti-asthmatic drug were included in mono-therapy group and those who received more than one drug were included in multi-therapy group. Among patients who received multi therapy (34 males, 18 females, 91.22%), 40.38% received 2 drugs

(13 males, 8 females), 42.30% patients received 3 drugs (13 males, 9 females), 13.46% received 4 drugs (6 males, 1 female), and 3.84% received 5 drugs (2 males).

Thirty four patients took over the counter (OTC) drugs, in which 42.1% were males and 17.54% were females. Among those patients who have not taken over the counter drugs, 19.30% were male and 21.05% were female. 42.10% were compliant, out of them 26.32% were males and 15.78% were females. About 57.89% were non compliant and out of them 35.08% were males and 22.81% were females.

Anti-asthmatic drugs were prescribed to asthmatic patients as oral, inhalation and others (injections), and more than one route was used for administration of drugs. 7.02% of patients were administered in oral, 5.26% in parental route, 1.75% in inhalation, 12.28% patients in combined route of inhalation and oral, and 40.35% in combined route of inhalation and parental. Besides, about 12.28% patients used combined route of oral and parental, 21.05% used combined route of oral, parental and inhalation drug administration.

Based on the diagnosis, the patients were classified. 43.85% were diagnosed as bronchial asthma (BA) (12 males, 13 females), 26.31% as chronic obstructive pulmonary disease (COPD) (13 males, 2 females), 8.77% as bronchitis (2 males, 3 females), 7.01% as tuberculosis (TB) (3 males, 1 female), 5.26% as BA with COPD (2 males, 1 female), 5.26% as BA with TB (2 males, 1 female), and 3.50% as TB with bronchitis (1 male, 1 female).

Table 1 showed the classes of drugs used.  $\beta$ -agonists were prescribed for 23.97% patients, corticosteroids for 22.60%, and methyl xanthines for 35.61%. Other combinations were prescribed for 17.80% patients.

Anti-asthmatics were prescribed for breathing difficulties such as allergy. The result showed that 30.23% of patients were triggered by dust (23 males, 16 females), 25.36% by smoke (20 males, 14 females), 23.26% by mosquito coil (18 males, 12 females), 3.10% by paint (3 males, 1 female), 10.08% by cold environment (5 males, 8 females), 0.78% by stress (1 male), 3.10% by fumes (3 males, 1 female), 0.78% by pesticides (1 male), 1.56% by pollens (2 females) and 0.78% by smell of dung (1 female). The patients also had one or more asthma triggers.

## 4. Discussion

A prescription-based survey is considered to be one of the scientific methods to assert and evaluate the rationality of the prescription<sup>[22]</sup>. This study was carried out to monitor the utilization of anti-asthmatics. It was studied that asthma was more prevalent in males than females. No sex difference concerning the utilization of anti-asthmatic medication was found in Swedish cross-sectional study<sup>[23]</sup>, whereas in UK it was found that males were more likely than females to have anti-asthmatic medication<sup>[24]</sup>.

There is considerable evidence implicating allergens particularly smoke and dust cause asthma. COPD can be caused by air pollution, but is more usually associated with cigarette smoking<sup>[25]</sup>. Twenty five patients who were smokers were prescribed with anti-asthmatic drugs. In the present analysis, smokers were likely to take anti-asthmatic drugs, and symptomatic smokers are also more likely to have asthma, and other respiratory symptoms because of chronic obstructive lung diseases<sup>[24]</sup>. Mortality for asthma is higher in elderly than in younger patients and continues to rise as

**Table 1**

Data based on anti-asthmatic drug.

	Drug name	Male	Female	Total
$\beta_2$ -agonists	Salbutamol	21(21.87%)	14(28.00%)	35(23.97%)
Corticosteroids	Dexamethasone	14(14.58%)	6(12.00%)	20(13.70%)
	Prednisolone	4(4.16%)	5(10.00%)	9(6.16%)
	Bromohexin	2(2.08%)	0(0.00%)	2(1.37%)
	Budesonide	1(1.04%)	1(2.00%)	2(1.37%)
Methyl xanthanes	Etophylline + theophylline	33(34.37%)	19(38.00%)	52(35.61%)
Other combinations	Terbutaline + bromohexine	13(13.54%)	4(8.00%)	17(11.64%)
	Ipratropium bromide + salbutamol	5(5.20%)	1(2.00%)	6(4.10%)
	Salbutamol + terbutalin	1(1.04%)	0(0.00%)	1(0.68%)
	Salbutamol + beclomethasone	1(1.04%)	0(0.00%)	1(0.68%)
	Budisonide + formeterol fumerate	1(1.04%)	0(0.00%)	1(0.68%)

aging[26–28].

Overall drug utilization pattern showed that methyl xanthines were the drugs of choice for asthmatic patients, followed by  $\beta_2$ -agonist and corticosteroids. Prescribing of salbutamol and deriphylline was more frequent because of the comparative less cost of the drug. The use of corticosteroids was the same as that of  $\beta_2$ -agonists. Potential adverse effects associated with glucocorticoids like oropharyngeal candidiasis[29], suppression of hypothalamic–pituitary at adrenal axis, bone resorption[30], have not restricted the physicians to use glucocorticoids. It indicates that the intervention is needed by the pharmacists to make the prescribers aware of the same when necessary.

Asthma patients often require more than one drug for controlling symptoms. Anti-asthmatic drugs were generally used in oral & inhalation route. In this study 99.22% of asthmatic patients had combination therapy.

Antacids were prescribed with iron preparation which interacts with each other. Other combination drugs prescribed were found to have beneficial drug interactions. Salbutamol was commonly prescribed with prednisolone which may be augment hypokalemia. From the lab reports it was noted that the potassium levels were not investigated. Adverse drug reaction was not reported for any patients by the physicians.

Certain aspects were emphasized during the study in patient counseling which included the following:

(1)To quit smoking and educated about the consequences of its usage; (2)Education on the importance of the treatment and its duration; (3)To avoid their known asthma triggers; (4) To adhere to the medication prescribed by their physician; (5)To be educated on how to use the inhalers; (6)To be educated for frequent check up, patient compliance; (7)To avoid OTC (over the counter) drugs; (8)To reduce exposure to tobacco, smoking; (9)Always to carry a short-acting  $\beta_2$  agonist; (10)To avoid the usage of alcohol, tobacco and narcotics.

The patients who came for consultation at this particular hospital were mostly under the economic status. They stated their economic status as the reason for choosing this hospital which was under the government control. With the poor economic status, the prescribers were unable to follow the guidelines for prescribing the anti-asthmatic drugs completely.

It was noticed that pharmacists usually distribute the

medicines without giving any written or detailed oral instruction. This was another lacunae found in the present study. Most of the patients were unaware of the drugs prescribed to them about the dosing schedule and its use.

Poor compliance to treatment is common among the patients, which makes it difficult to manage asthma and can increase both morbidity and mortality. Non-compliance is generally attributed to a lack of motivation. However, compliance is influenced by many psychosocial & socioeconomic pressures. It was suggested that interventions have to be done by providing patient counseling and improving the current prescribing trend for better and rational utilization.

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