



## Drug Utilization and Prescription Monitoring of Asthma Patients

Vijaya Kumar S, Sasi Kala M, Mohamed Saleem TS, Gauthaman K

*Department of Pharmacology, Himalayan Pharmacy Institute, Sikkim -737 136, India*

*Address for correspondence: Mr. S. Vijaya Kumar; E-mail: vijayvijay66@yahoo.co.in*

---

### ABSTRACT

The present study was conducted to establish prescription trends of anti-asthmatic drugs at the Central Referral Hospital, Tadong and Gangtok, Sikkim. The study was conducted using WHO-based prescription-auditing performa. Data were recorded from the patients attending the hospital outpatient department (OPD) through a chance, random sampling method. Methylxanthine (40%) was the most frequently prescribed drug among anti-asthmatics, followed by  $\beta$ 2-agonists (27%), corticosteroids (23%), and mucolytics (09%), which were the least prescribed. Our study further found that combination therapy (80%) was given to a significant number of patients as compared to monotherapy (20%). In combination therapy, the two-drug combination was the most often prescribed (57.69%). Further, anti-asthmatic drugs were mostly given (68.18%) by the oral route, followed by the inhalation route (27.27%) and injection route (4.55%). The asthmatic problem was more prevalent in grade III employees that includes drivers and laborers. It has been concluded that a study may be more meaningful to further improve the prescribing as well as dispensing practices of the pharmacist through successful implementation of interventional programs in health centers.

**Key words:** Asthma, drug utilization study, prescription monitoring

**DOI:** 10.4103/0975-1483.55753

---

### INTRODUCTION

Asthma is an immune inflammatory disease that needs prolonged treatment. Each patient is supposed to know the course of the disease and the methods of its management. Several factors such as aeroallergens, drugs, chemicals, exercise, cold dry air, infections, and emotions etc can aggravate the symptoms and precipitate attacks.<sup>[1,2]</sup> It has been reported that the incidence of asthma is increasing, especially in children, both in Western and many developing countries. However, the true extent of the problem is not well clarified.<sup>[3]</sup> The basic therapeutic principles for most diseases dictate that treatment should be based on establishing a working diagnosis, followed by an initial assignment of severity to provide a guide to the intensity of therapy that will be needed. Thereafter, for

chronic disease, treatment decisions are usually based on whether control of the disease processes and their clinical manifestation has been achieved. The situation is more complex for asthma, a heterogeneous syndrome whose natural history is characterized by the variability in its symptoms and signs over time.<sup>[4]</sup> Despite major advances in understanding the etiology and pathophysiology of asthma and the development of new therapeutic modalities, the prevalence, severity, and mortality from asthma have all increased over the past decades in all age groups.<sup>[1]</sup> This study was conducted to establish the current prescription trends for asthmatic CRH patients. Further, an attempt has been made to identify the attitudes of physicians and patients towards pharmacological and nonpharmacological approaches in the management of asthma. The study highlights the lacunae in the current prescribing practices

and the role of pharmacists in improving patients' health and in optimizing the costs of drug regimens.

## MATERIALS AND METHODS

The study was conducted by using structured and nonstructured questionnaires targeting the asthmatic patients in Sikkim. The study was started at CRH, Tadong, Gangtok, East Sikkim. We randomly selected patients from the OPD and monitored them according to WHO prescription-monitoring performa.<sup>[5]</sup> Co-operative patients were interviewed and information was filled in semi-structured, coded performa. Most of the prescription-monitoring was conducted from March 2008 to December 2008. Only asthmatic patients were included in the study; asthmatic patients who suffered from other diseases, such as hypertension and heart problems, and other comorbidities such as peptic ulcer, diabetes mellitus, and migraine, were excluded from the study. Also, patients suffering from acute bronchitis, chronic bronchitis, chronic obstructive pulmonary disease (COPD), and community-acquired pneumonias were also excluded. Further, an attempt was also made to group the patients based on their socio-economic criteria. Accordingly, patients were categorized into three groups (grades) I, II, and III. Gardeners, security guards, laborers, drivers, and peons were recorded as grade III employees; clerical staff as grade II, and academicians or people in administration were considered to be grade I employees. Anti-asthmatic-drugs available at the health center at the time of data collection, were corticosteroids (i.e., beclomethasone)  $\beta_2$ -agonists (i.e., Salbutamol, Salmeterol and terbutaline), and methylxanthines (i.e., theophylline and etophylline).

## RESULTS

During the study, 148 patients were monitored but only 108 prescriptions were included for data analysis as per the inclusion and exclusion criteria. Demographic analysis of data revealed that there were 61% males and 38.88% females in the study whose results are shown in Table 1.

The socio-economic status of the asthmatic population represented in this study was as follows: 22 (20%) were grade I employees, 38 (35%) were grade II, and 48 (44%) were grade III employees. The percentages of the patients who received either monotherapy or combination therapy, i.e., two, three, four, or five drug regimens, showed that 20% of all the patients were treated with a single anti-asthmatic drug and 80% of the patients were treated with anti-asthmatic drug combinations [Table 2]. Among the

male patients, 16 (24%) were on monotherapy and 54 (81%) were on combination therapy [Table 2]. On the other hand, of the female patients, six (14%) were on monotherapy and 32 (76%) were on combination therapy [Table 2]. In the monotherapy category, only four classes of drugs were used: methylxanthines (40%),  $\beta_2$ -agonists (27%), corticosteroids (23%), and mucolytics (09%). The overall utilization pattern was also similar with methylxanthines (Aminophylline and theophylline combination), Deriphylline Retard 300 mg (43%), being the most frequently prescribed drugs [Table 3].  $\beta_2$ -agonists, salbutamol, salmeterol, and terbutaline (20%) were marginally behind, followed by corticosteroids (Beclomethasone, Prednisolone, Budesonide) (31%), and mucolytics (Bromhexine, Ambroxol) (05%) [Table 3]. Table 4 shows the most important formulations used for the treatment of asthma. Where as, Figure 1 shows the proportion (%) of different anti-asthmatic drugs prescribed to asthmatic patients: oral, inhalation, and injections. Overall, 63 (58%) anti-asthmatic drugs were taken orally,

**Table 1: Demographic distribution of asthmatic patients receiving monotherapy and combination therapy**

Age groups (years)	Male N = 66 (%)	Female N = 42 (%)	All patients N = 108 (%)
1-10	2 (3)	2 (5)	4 (4)
11-20	2 (3)	12 (28)	14 (13)
21-30	36 (54)	6 (14)	42 (39)
31-40	8 (12)	14 (33)	22 (20)
41-50	4 (6)	2 (5)	6 (6)
51-60	4 (6)	2 (5)	6 (6)
61-70	6 (9)	2 (5)	8 (7)
71-80	4 (6)	2 (5)	6 (6)
Range (years)	01-80	01-80	01-80

N = Number of Patients (Figures in parentheses for column total indicate percentage of the total patients)

**Table 2: Anti-asthmatic drug combinations**

Drug therapy	Male N = 70	Female N = 38	All patients N = 108
Monotherapy therapy	16 (24%)	6 (14%)	22 (20%)
Combined therapy	54 (81%)	32 (76%)	86 (80%)
Total			108 (100%)

N = Number of Patients (Figures in bracket for column total indicate percentage of the total patients)

**Table 3: Anti-asthmatic drug utilization**

Anti-asthmatic drugs	Monotherapy frequency N (%)	Overall utilization* frequency N (%)
Methylxanthines	9 (41)	46 (43)*
$\beta_2$ -agonist	6 (27)	22 (20)*
Corticosteroids	5 (23)	34 (31)*
Mucolytics	2 (09)	06 (05)*
Total	22 (100)	108 (100)**

(Figures in bracket for column total indicate percentage of the total patients); \*Overall utilization includes both monotherapy at combination therapies; \*\*Total exceeds 100% since the average patient receive more than one drug.

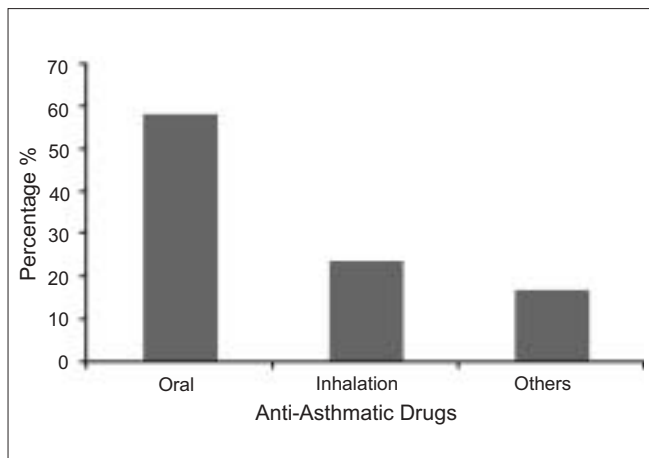


Figure 1: Different dosage forms used by asthmatic patients

Table 4: List of anti asthmatic drugs used with dose

Drug	Formulation	Dose	Brands
Aminophylline	Tablets and Injection	100 mg (bid) 250 mg/2 mL	Aminophylline Minophyl
Bambuterol	Tablets and Solution	10–20 mg, 1 mg/mL (tid)	Bambudil, Betaday, etc.
Beclomethasone	Inhaler	50–200 mcg 2–4 times/day	Beclate, Becoridebe, Bevent
Betamethasone	Tablets, Drops and Injection	0.6–7.2 mcg/ day	Belar, betalar, Betnesol, solubet
Budesonide	Inhaler	100–200 mcg (bid)	Budecord, Budez, Pulmicort
Salbutamol	Tablets, Inhaler and Syrup	100–250 mcg (bid)	Asthaline, Salbu, Bronchotab, Ventrolin.
Theophylline	Tablets, Injection and Syrup	80–240 mg (tid)	Deriphylline, Phylobid, Phyloday, TheoPA, TheoSR.

26 (24%) via inhalation, and 19 (17%) by other routes of administration.

### DISCUSSION

Literature reports many treatment guidelines<sup>[6,7]</sup> for asthma that recommend regular treatment with inhaled corticosteroids for patients with mildly persistent asthma as this treatment regimen provides control of asthma, suppresses airway inflammation, and may prevent the progression of asthma. Although the doubling of the dose of inhaled corticosteroids has been reported to be ineffective in preventing exacerbation of asthma, high-dose inhaled corticosteroids administered at the onset of exacerbation

have been reported to enhance the control of asthma.<sup>[8]</sup> However, a prescription-based survey is considered to be one of the scientific methods to assess and evaluate the rationality of the prescription and lacunae, if any, in the dispensing practices of pharmacists. Recommendations of various international bodies on asthma to improve the prescribing practices of the physicians and ultimately, clinical standards, are now available.<sup>[9,10]</sup> In our study, we found that drug utilization of anti-asthmatics revealed that asthma was reported more in male patients than in females. Whereas, demographic characteristics, of our study found that more male (61%) suffered from asthma than did females (39%). Overall drug utilization patterns showed that methylxanthines were the drugs of choice for asthmatic patients, probably due to their lower cost, findings that were in agreement with those reported by Kumar et al.<sup>[5]</sup>. The use of glucocorticoids was found to be through monotherapy (23%) and combination therapy (31%). However, potential adverse effects associated with glucocorticoids such as oropharyngeal candidiasis, suppression of the hypothalamic-pituitary adrenal axis, bone resorption, restricted their use. This indicated awareness among prescribers.<sup>[11,12]</sup> Overall, 20% of the patients were treated with a single anti-asthmatic drug whereas 80% patients were treated with anti-asthmatic drug combinations. Sixteen males (24%) were on monotherapy and 54 males (81%) were on combination therapy. On the other hand, six females (14%) were on monotherapy and 32 (76%) were on combination therapy. This study found that 58, 26, and 19% of anti-asthmatic drugs were prescribed orally, via inhalation and by injection. However, the inhalation route causes a high local concentration in the lungs with a low systemic delivery, thereby, significantly improving the therapeutic ratio and minimizing systemic side effects.<sup>[12,13]</sup> We found that grade III employees (gardeners, grivers, laborers, and peons) showed a greater incidence of asthma but were unaware about prescribed anti-asthmatic drugs. It was also noticed that pharmacists usually distributed medicines without giving any written or detailed oral instructions. Thus, our study highlights the lacunae in the prescription trends which prevent proper, rational utilization of drugs by patients.

### CONCLUSION

It has been concluded that further studies may help to improve the prescribing and dispensing practices of pharmacists through successful implementation of interventional programs in health care centers. Future studies may help to clarify the role of xanthines in comparison to inhaled steroids in the treatment of asthma.

## REFERENCES

1. Shaji J, Lodha S. Management of Asthma: A Review. *Indian J Hosp Pharmacy* 2008;45:88-100.
2. Mishra N, Rao KVR, Padhi Sk. Asthma education for better compliance in disease management. *Indian J Allergy Asthma Immunol* 2005; 19:25-8.
3. Golshan M, Amra B, Zadeh ZM. Prevalence of asthma in high school adolescents of Isfahan. *Med J Iran Hosp* 2001;4:35-40
4. Taylor DR, Bateman ED, Boulet LP, Boushey HA, Busse WW, Casale TB, et al. A new perspective on concepts of asthma severity and control. *Eur Respir J* 2008; 32:545-54.
5. Anil K, Tiwari HK, Kulkarni SK. Drug utilization Assessment in Asthma Therapy through prescription Monitoring. *Indian J Hosp Pharmacy* 2004;2:70-2.
6. NAEPP Expert Panel Report: guidelines for the diagnosis and management of asthma-updates on selected topics 2002. Bethesda, MD: National heart, lung, and blood institute, 2002. (NIH Publication No. 02-5075). [accessed on 2007 Apr 30]. Available from: <http://www.nhlbi.nih.gov/guidelines/asthma>.
7. Global Initiative for Asthma. Global strategy for asthma management and prevention: NHLBI/WHO workshop report. Bethesda, MD: National heart, lung, and blood institute, 2006. [accessed on 2007 Apr 30]. Available from: <http://www.ginasthma.org>.
8. Papi A, Canonica GW, Maestrelli P, Paggiaro P, Olivieri D, Pozzi E, et al. Rescue use of beclomethasone and albuterol in a single inhaler for mild asthma. *N Engl J Med* 2007;356:2040-52.
9. Ungar WJ, Coyte PC. Prospective study of the patient level cost of asthma care in children. *Pediatr Pulmonol* 2001;32:101-8.
10. Dartnell J. Activities to improve hospital prescribing. *Aust Prescrib* 2001;24:29-31.
11. Ip M, Lam K, Yam L, Kung A, Ng M. Decreased bone mineral density in premenopausal asthma patients receiving long-term inhaled steroids. *Chest* 1994;105:1722-7.
12. Johnson CE. Aerosol corticosteroids for the treatment of asthma. *Drug Intell Clin Pharm.* 1987;21:784-90.
13. Taburet AM Schmit B. Pharmacokinetic optimization of asthma treatment. *Clin Pharmacokinet* 1994; 26:396-418.

**Source of Support:** Nil, **Conflict of Interest:** None declared.

## OTHER ACTIVITIES - INPHARM

- **Young Pharmacists Group of India** –InPharm is the main association of young pharmacists in India (Age upper limit - 35yrs) and aims at improving the knowledge of young Pharmacists. YPGI - InPharm exists to stimulate the exchanges and networking between young Pharmacists, to foster the co-operation and the sharing of best practices amongst them, particularly in the field of pharmaceutical education and research.
- **Global Pharmacy Students Federation (GPSF)** is one of the non - profit global network that enables students and youth to interact with students of other countries to collaborate on projects/studies that enhance pharmaceutical learning and make a difference in the world.
- **The mission of the Women Pharmacists Group (WPG-InPharm)** is to help & develop outstanding women pharmacists, who impact with knowledge and integrity. The WPG-InPharm group is dedicated to support women through education and research. In addition, WPG-InPharm provides an atmosphere for personal growth and social networking for women pharmacists. WPG-InPharm recognizes, and works to eliminate, the multiple levels of oppression that act in society.