



International Journal of Current Pharmaceutical & Clinical Research

www.ijcpcr.com

COST ANALYSIS OF DRUGS USED FOR ASTHMA IN TERTIARY CARE HOSPITAL

Blessy Maria Thomas*, Anup Kumar, Esther L Lalsim, Jojo S Johnson, Lalramliani Lalsim

Department of Pharmacy Practice, The Oxford College of Pharmacy, Hongasandra, Bangalore- 560068, Karnataka, India.

ABSTRACT

The present study evaluated cost of drugs used for asthma patients at tertiary care hospital. Predesigned case record form was used for factoring patient's demographical profile, illness history, prescription regimen and cost of drug prescribed for evaluation. A total 150 prescriptions were analyzed in which Maximum prescriptions were of the age group between 20 -40 yr (44.64%). Average number of drugs per prescription was 2.38. The average cost/day/patient for management of asthma among patients was found to be Rs 55.67/- When taken into account of anti-asthmatic drug only, the costliest drug was found to be inhaled corticosteroids (Budesonide) followed by formeterol. In the inhalational drugs budesonide was the most expensive drug prescribed (30 INR) and in oral drugs prescribed Montelukast (26 INR) was the most expensive drug prescribed. As asthma affects every population the cost of therapy was not found economic. The practice of prescribing drugs with high efficacy and optimum cost needs to be followed in order to reduce medical and financial burden of the patient resulting in improvement of health.

Key words: Asthma, Budesonide, Formeterol, Cost, Case record form, Efficacy, Monteleukast.

INTRODUCTION

Asthma is a chronic disease characterized by recurrent attacks of breathlessness and wheezing, which vary on severity and frequency from person to person. During an asthma attack the lining of the bronchial tube swells, causing the airways to narrow and reducing the flow of air into and out of the lungs (WHO, 2017). Numerous factors affect the cost of childhood asthma, like disease severity, under treatment, inadequate preventive drug use and inadequate medication regimens, exposure to environmental agent and lack of education of patient's families and caregivers [1].

Asthma affected an estimate of 300 million people worldwide. The prevalence of asthma is increasing every year. The WHO has estimated 15 million disability adjusted life years are lost and 2, 50,000 deaths are reported worldwide. There are about 489,000 deaths attributable to asthma annually and the majority of deaths occur in low and middle income countries, particularly

Oceania, South and Southeast Asia, the Middle East, and Africa. Patients from low and middle income countries have more severe symptoms than those in high income countries, possibly due to incorrect diagnoses, poor access to health care, unaffordability of therapy, exposure to environmental irritants, and genetic susceptibility to more severe disease [2].

The cost of illness associated to asthma is around \$6.2 billion. Each year an estimate of 1.81 million people (47.2 % individuals aged 18 yrs or above) require treatment in emergency department. Asthma is responsible for significant medical resource utilization and given that it is a chronic condition, cost effectiveness is a major consideration in the evaluation of treatment options [3].

Long term treatment is generally required for an effective management of asthma, which has an effect on the cost of the therapy and patient's compliance. When uncontrolled, asthma can place severe limits on daily life

Corresponding Author :- **Blessy Maria Thomas** Email:- blessy.jyvirans@gmail.com

and sometimes fatal. Proper prescribing pattern needs to be followed in order to reduce the burden of the disease in terms of morbidity, mortality, betterment in the quality of life and ensures the reduction of economic burden of the patients. Asthma's cost effectiveness is also a major consideration in the evaluation of its treatment options [4]. Pharmacoeconomic studies are crucial, as now many third-party payers, such as government and private health-care plans, are requiring these studies to be performed in order to decide if they will reimburse the claim [5].

This study will help in interpretation of the therapy options used in this healthcare setting and providing treatment options having optimum therapy with maximum safety and efficacy at low cost as asthma affects every population. This study will also help the health care professionals to analyse the burden of drugs and cost of the treatment for patients. Prescribing patterns among the physicians and compliance to the treatment by Patient is largely influenced by the cost of the treatment. This study will help to determine the cost effectiveness of different antiasthmatic agents. Financial restrictions on the National Health Service have increased in recent years, one area where there is scope for rationalization and cost saving in drug prescribing.

MATERIAL AND METHODS

We conducted a cross sectional cost analysis study for a period of 6 months considering the inclusion and exclusion criteria asthma prescriptions were selected from General Medical Ward (Male and Female) and outpatient department of The Oxford Medical College, Hospital and Research Centre, Attibele, Bangalore in which a total 150 number of prescriptions were analyzed. Pre designed case record form was used for factoring patient's demographic details, prescribed drugs and their cost for the analysis. Ethical approval is obtained from the Institutional ethics committee of The Oxford Medical College, Hospital and Research Centre, Attibele, Bangalore. Prescriptions for patients with either sex, patients above 18 years of age, in patients and out patients, patients with co-morbidities, pediatrics and pregnant women were included in the study. Patients discontinuing treatment midway were excluded from the study.

The data was collected from inpatient case records and outpatient card. The cost of the medications was obtained from the hospital pharmacy and Current Index of Medical Specialties (CIMS). Statistical Analysis was performed using Microsoft Excel 2007. The data was presented using frequencies, percentages along with appropriate graphs and charts. The quantitative variables were presented using descriptive statistics such as mean, and standard deviation. The Association between variables was tested using t-test. The level of significance was set at 0.05. All p values less than 0.05 are considered as significant.

RESULTS AND DISCUSSION

The current study analyzed the cost of asthma therapy with focus on Inhalational corticosteroid and beta-2 agonist drugs to generate data with respect to the extent of variability of the cost, among group of patient suffering from asthma. In our study, prescriptions of 150 patients were studied.

Age and Gender distribution

On analysis of the prescriptions, it was found that asthma was reported more in male patients (57%) than in females (43%). Majority of the prescriptions analyzed were of the age group 20- 40 years. A very less prescriptions (3.33%) were found below the age of 20 years. A study conducted by Anuj P and coworkers in eastern India in the year 2014 showed the similar frequency of asthma patients in the age group of our study [6].

Prescribing Indices

Average drugs/patient in the prescriptions was found to be 2.38. Out of 150 prescriptions 16% had only 1 asthma drugs and 84 % prescriptions had 2 or more asthma drugs. A study conducted at Dehradun, India, reported that 84% asthmatic patients were on multiple drug therapy and only 16% patients were on single drug therapy which matches precisely with our study. The result of this study demonstrates similar prescribing pattern in comparison with the present study. Among those patients treated with multiple drug therapy, three drug combinations were more widely prescribed (41%) than two drugs (35%) or four drug (12 %) combination but in our study (two drugs 39%) is more commonly prescribed [7].

Cost Analysis

The average cost/day/patient for management of asthma is found to be 55.67 INR (Std. Dev = 12.53). The minimum and maximum cost of prescription is found to be 20 INR and 76 INR respectively. When taken into account of anti-asthmatic drug only, Beclomethasone (14.5 INR) was found to be most cost effective inhaled corticosteroid and salbutamol (8.8 INR) alone was found to be cost effective beta agonist prescribed. Budesonide (30 INR) was the most expensive inhalational drug prescribed followed by Salbutamol+Ipratropium bromide (20 INR) and Beclomethasone+Levosalbutamol (14.5 INR). In oral drugs prescribed Montelukast (26 INR) was the most expensive drug prescribed followed by salbutamol alone (8.8 INR), Theophylline (7 INR) and Prednisolone (2.8 INR). This is in resemblance with the study conducted by Stejin and coworkers in the year 2012 [8]. The high cost of prescription observed in the prescriptions may be attributed to high usage of inhalational corticosteroid (Budesonide) in these prescriptions. Buxton and coworkers showed that salbutamol was more cost effective than formoterol because of its lower acquisition cost. By our study also

revealed that salbutamol was the most commonly prescribed drug for asthma patients. In other medications ceftriaxone was the most expensive drug prescribed.

The patients in the present study were treated according to best practice by their primary care practitioner who followed national recommendations, and they were also assessed expertly and regularly. However, effective asthma control reduces cost particularly by decreasing hospitalization. Weiss and coworkers recently pointed out that, "the number of hospitalizations will fall when national treatment guidelines are followed", and cost of asthma are, "largely due to uncontrolled disease, indicating that current therapies are either underused or misused in practice [9].

Krahn and coworkers showed that increase use of more expensive combination inhalers have likely contributed to the rising costs of asthma medications in

recent years [10]. David HS and coworkers showed that recent data suggest that inhaled beta agonists are the most frequently used medication, it is expected that the therapy patterns have shifted towards greater use of inhaled corticosteroids [11].

As recommended by GINA Guidelines, Formeterol along acting beta agonists was not prescribed as Monotherapy and it was given in combination with ICS. Cost analysis along with prescription pattern studies can play a key role in helping the healthcare system to understand, interpret and improve the use of medications and reduce the economic burden [12]. Information generated through such surveys may assist healthcare systems and hospitals to design educational programs that may improve prescribing, drug use, cost of therapy and educate patients. They also provide feed-back on prescribing pattern treatment costs [13].

Table 1. Age wise distribution of patients

Age (in years)	No. of Patients	Percent(%)
1 – 20	5	3.33
21– 40	67	44.64
41 – 60	41	27.33
61- 80	37	24.70
Total	150	100

Table 2. Descriptive Statics for total number of drugs per prescription

Static	Measure (Only Asthma drugs)
No. Of Prescriptions	150
Min. Drugs	1
Max. Drugs	5
Average	2.38
Std. Deviation	1.58

Table 3. Total Number of Drugs Prescribed

Parameters	Details
Total No. Of Prescriptions	150
Total No. of Drugs Prescribed	359
Average drugs per prescription	2.39
No. Of Drugs Prescribed(Only Asthma Drugs), Monotherapy	16%
Drug combinations	86%
No. Of drugs (2 or more)	2 drugs -39%
	3 drugs- 34%
	4 drugs – 9 %
	5 drugs – 0.03 %

Table 4. Descriptive Statistics for Cost per Prescription

Static	Measure
No. of Prescriptions	150
Minimum cost	20
Maximum cost	76
Average	55.67
Std. Deviation	12.53

Table 5. Cost Analysis of Drugs used in Asthma(Asthma Medications)

Drugs Prescribed	Cost/Day/Patient(In INR)
Budesonide	30
Theophylline	07
Monteleukast	26
Salbutamol+Ipratropium Bromide	20
Beclomethasone+Levosalbutamol	14.5
Budesonide+Formeterol	27.5
Prednisolone	2.8
Salbutamol	8.8

Table 6. Cost Analysis of Drugs used in Asthma(Other Medications)

Drugs Prescribed	Cost/Day/Patient(In INR)
Ceftriaxone	58.51
Albendazole	9
Levofloxacin	8.7
Pantoprazole	8
Acetaminophen	1.8
Ranitidine	4.8
Dextromethorphan Hydrobromide+Phenylephrine	4.8
Tramadol	2.9
Aluminium Hydroxide	10.6
Amlodipine	6.58
Telmisartan	17

Table 7. Cost Analysis according to route of administration (Inhalational drugs)

S. No	Drugs Prescribed(Inhalational Drugs)	Cost/day/Prescription(INR)
1.	Budesonide	30
2.	Salbutamol+Ipratropium bromide	20
3.	Beclomethasone+Levosalbutamol	14.5
4.	Budesonide+Formeterol	27.5

Table 8. Cost Analysis according to route of administration (Oral Drugs)

S. No	Drugs Prescribed	Cost/Day/Prescription(INR)
1.	Theophylline	7
2.	Montelukast	26
3.	Prednisolone	2.8
4.	Salbutamol	8.8

Fig 1. Gender wise distribution of patients
Gender Distribution

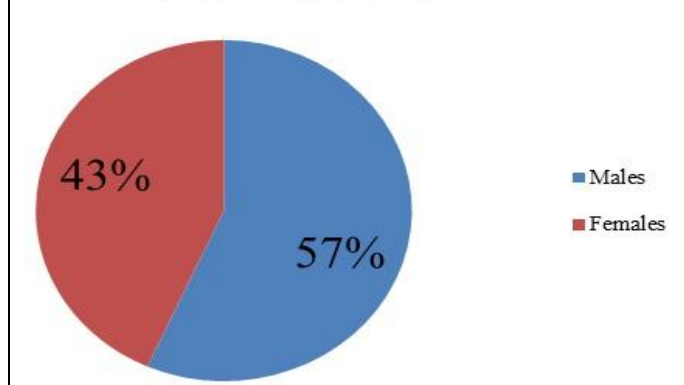


Fig 2. Age Wise Distribution of Patients
Age Distribution

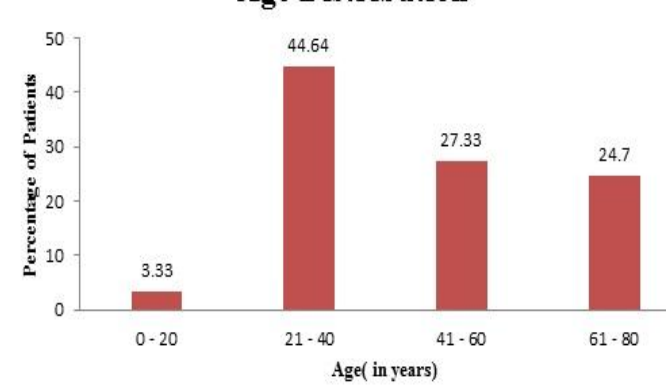


Fig 3. Total Number of Drugs Prescribed.

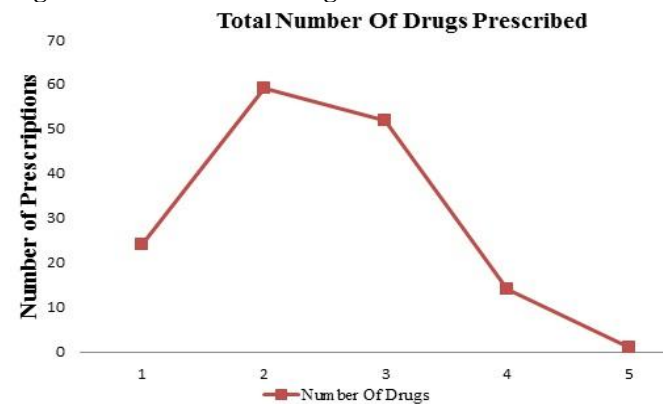


Fig 4. Cost Analysis of Drugs used in Asthma (Asthma Medications)

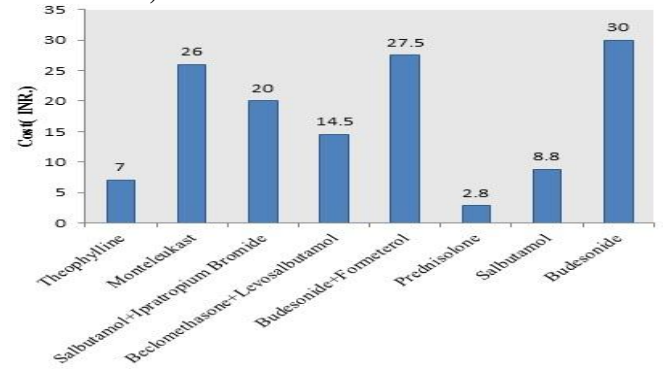


Fig 5. Cost Analysis of Drugs used in Asthma(Other Medications)

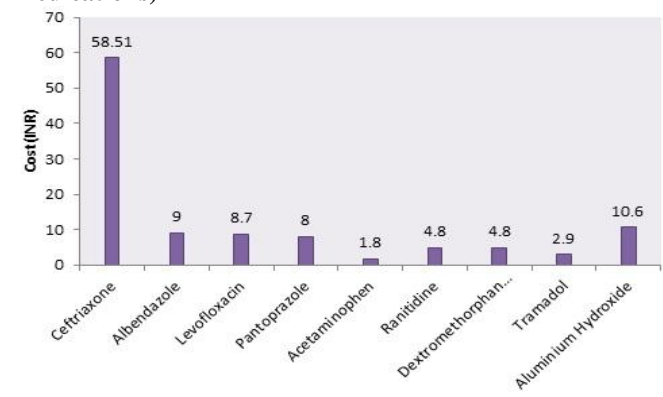


Fig 6. Cost Analysis according to route of administration (Inhalational Drugs)

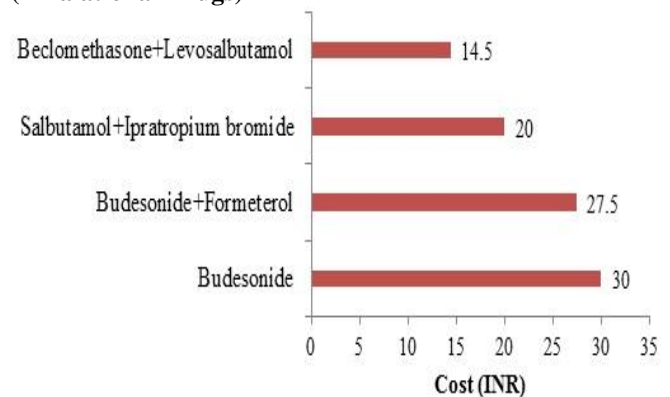
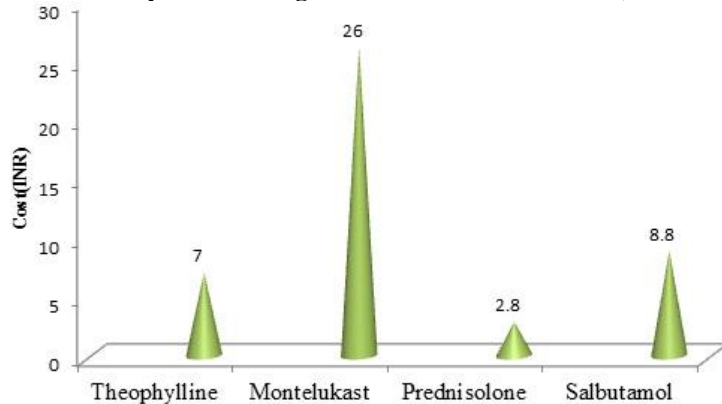


Fig 7. Cost Analysis according to route of administration (Oral Drugs)



CONCLUSION

The cost analysis study showed high burden of cost of therapy on patient and on society as asthma is a common diseased condition and affects every population. The practice of prescribing drugs with high efficacy and optimum cost needs to be followed in order to reduce medical and financial burden of the patient resulting in improvement of health. Cost analysis studies can be much of significance in helping the healthcare system to understand, interpret and improve the use of medications and their cost. Information generated through this study

may assist healthcare systems and hospitals to design educational programs that may improve prescribing, drug use, cost of therapy and educate patients. They also provide feed-back on prescribing pattern treatment costs.

ACKNOWLEDGEMENTS

The authors express sincere gratitude to Dr. Padmaa. M. Paarakh, Professor and Principal of The Oxford College of Pharmacy, Bangalore for providing us an opportunity to do this research work.

CONFLICT OF INTEREST

No Interest

REFERENCES

1. Barnes PJ, Jonsson B, Klim J B. The costs of asthma. *EurRespir J*, 9, 1996, 636–42.
2. Garje Y, Suman R, Deshmukh Y, Patra V. Prescribing patterns and pharmacoeconomic analysis of drugs used in pediatric asthma patients at tertiary care hospital. *World Journal of Pharmacy and Pharmaceutical Sciences*, 3(6), 2016, 1448-1465.
3. Kim H, Mazza J. Allergy. *Asthma & Clinical Immunology*, 7 (1), 2011, S2.
4. Akinbami L J, Moorman JE, Garbe PL, Sondik E J. status of childhood asthma in the United States 1980-2007. *Pediatrics*, 123, 2009, 5131-4587.
5. Glynn D. Reimbursement for New Health Technologies: Breakthrough Pharmaceuticals as a 20th Century Challenge. *Pharmacoeconomics*, 18(S1), 2007, 59–67.
6. Buxton MJ, Sculpher MJ. The Episode-Free Day as a Composite Measure of Effectiveness: An Illustrative Economic Evaluation of Formoterol Versus Salbutamol in Asthma Therapy. *Pharmacoeconomics*, 4(5), 1993, 345-52.
7. Corbridge S, Corbridge TC. Asthma in adolescents and adults. *Am J Nurs*, 110(5), 2010, 28-38
8. Stejin J, Kishor KV, Nandha KN, Srinivasan A, Arul PKC and Kannan S. Pharmacoeconomic Analysis of Asthma in Pediatric Patients in Tertiary Care Hospital in Kerala. *Indian Journal of Pharmacy Practice*, 5(3), 2012, 25-29.
9. Weiss K B, Sullivan S D. Understanding the costs of asthma: the next step. *CMAJ*, 154, 1996, 841-3
10. Krahn M D, Berka C, Langlois P and Detsky A S. Direct and indirect costs of asthma in Canada, 1990. *Canadian Medical Association Journal*, 154(6), 1996, 821-31
11. David HS, Daniel CM, Kenneth AL, Lynn JO, Carmelina B, William BS. A National Estimate of the Economic Costs of Asthma. *Am J Respir Crit Care Med*, 156, 1997, 787–93
12. Prasad A, Pradhan S, Datta P, Samajdar S, Panda P. Drug prescription pattern for bronchial asthma in a tertiary-care hospital in Eastern India. *National Journal of Physiology, Pharmacy and Pharmacology*, 5(3), 2015, 263.
13. <http://www.who.int/topics/asthma/en/>