

A Prospective Study On Drug Utilization And Prescription Monitoring In Asthma Patients At A Tertiary Care Hospital

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Abstract:

Objective:

Drug Utilization Review can play a key role in helping the healthcare system to understand, interpret and improve the prescribing administration & use of medications. As the incidence of asthma is increasing, especially in adults, children in India. The aim of the present study was to evaluate the drug utilization and monitoring the prescription in anti-asthmatic drugs at a tertiary care hospital in Tamilnadu. Methods: The study was conducted using WHO-based prescription auditing Performa. Data were recorded from the patients attending the hospital outpatient department (OPD) by a chance of random sampling method. Results: Methylxanthines 101 (46.1%) was the most frequently prescribed drug among anti-asthmatics, followed by β 2-agonists 45 (20.5%), corticosteroids 37 (16.1%), Anti-Histamines 17 (7.7%), anticholinergics 8 (3.6%) Was the least prescribed. Our study further found that combination therapy (81.3%) was given to a significant number of patients as compared to monotherapy 41 (18.7%). In combination therapy, the two-drug combination was the most often prescribed 128 (58.44%). Further, anti-asthmatic drugs were mostly given 149 (68.0%) by the oral route, followed by the inhalation route 59 (26.9%) and injection route 18 (8.21%). Conclusion: 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: Drug Utilization Review, Prescription Monitoring, Asthma Patients, Anti-asthmatic drugs

1. INTRODUCTION

Drug utilization research is defined by WHO as “marketing, distribution, prescription and use of drugs in a society, with special emphasis on the resulting medical, social and economic consequences”. Drug utilization evaluation (DUE) or drug utilization review (DUR) is an essential part of pharmaco epidemiological studies which provide a proper understanding

usage pattern of drugs, quality and efficiency use of drugs and its outcomes. DUR can play a key role in helping the healthcare system to understand, interpret and improve the prescribing administration and to maintain the rational use of drugs which assist the physician's prescribing attitude in accordance with the predetermined standards by allocating them with the feed-back and also in designing, conducting and imparting educational programmes for healthcare providers [1,2].

Asthma is a chronic inflammatory disorder of the airways characterized by bronchial hyper-responsiveness and airflow limitation that may vary in severity and frequency from person to person. The symptoms of asthma include recurrent episodes of wheezing, breathlessness, chest tightness and cough [3]. The characteristic patho physiological changes in asthma involve several inflammatory cells and mediators that contribute to symptoms. In India, asthma is known to be one of the major causes of morbidity and mortality, comprising about 3–11% of adults and 3–5% of pediatric population [4]. Drugs play an important role in improving human health and promoting well-being. However, to produce the desired effect, they have to be safe, efficacious and have to be used rationally. In Asthma like diseases where a lot of population is suffered from, it becomes very essential to spread a thorough awareness among the patients in relation to medication and disease itself. So the drug utilization evaluation among the asthmatic patients will provide a powerful tool in order to find out depth of awareness in patients and physician. The technique of drug utilization review (DUR) can provide a useful means of determining whether drug use is appropriate in the treatment of individual patients [5]. The World Health Organization (WHO) addressed drug utilization as the marketing, distribution, prescription and use of drugs in a society, considering its consequences, either medical, social, and economic [6]. Drug utilization review is design to –

1. Review drug use &/or prescribing pattern.
2. To detect & help to prevent drugs interactions.
3. To determine & prevent adverse drugs reaction in sensitivity pattern.
4. To detect the potential drugs toxicity.
5. To develop criteria & standards which prescribe optimal drug use.
6. To promote appropriate drugs use through education & other intervention.
7. To provide feed-backs of results to clinicians & other relevant groups.

Drug utilization review (DUR) is also known as Drug use/ utilization evaluation (DUE). Drug utilization review is increasingly used in the era of cost constraints and quality assurance [7]. The DUR has been adapted by pharmacists to assess appropriateness of usage of various medications. DUR can play a key role in helping the healthcare system to understand, interpret & improve the prescribing administration & use of medications. DUR information may assist healthcare systems & hospitals to design educational programs that may improve prescribing & drug use [8, 9]. They also provide feed-back on physician's performance & prescribing pattern or treatment protocols. The DUR information may also useful in motivating physicians to change their prescribing habits in an effort to improve care.

2. MATERIALS AND METHODS

The Prospective observational study was carried out over a period of 9 months from Sep-2018-April 2019, in the respiratory department of a tertiary care hospital. It was planned to analyze the utilization patterns of anti-asthmatic drugs in 219 patients after obtaining the

Institutional ethics committee approval. The study was conducted by using a set of questionnaires targeting the asthmatic patients in Tamilnadu, The patients aged between 17-70years were randomly selected from among patients diagnosed with asthma from OPD and monitored them according to WHO prescription monitoring proforma. The prescriptions of co-operative patients diagnosed with asthma were collected and were interviewed for different parameters.

Inclusion Criteria: The patients diagnosed with asthma and on anti-asthmatic prescription were included in the study

Exclusion Criteria: The asthmatic patients who suffered from other diseases such as hypertension and heart problems and other co morbidities such as bronchitis, chronic obstructive pulmonary disease (COPD), peptic ulcer, diabetes mellitus and migraine were excluded from the study.

The patient data was collected from the interviewed patients and all the necessary relevant data was collected from the patient such as treatment charts, and laboratory data reports were entered in the predesigned proforma. The patients were categorized into three grades (group) I, II, III. People in administrations were included in Grade-I, while Employees, clerical staff in Grade-II and Gardeners, security guards, drivers, peon and others were included in Grade-III. The data collected through the interview was examined for the number of parameters such as age, sex, social history and drug therapy used for the treatment. The data gathered were analyzed for different parameters like age, sex, profession, social history, and treatment therapy used.

3. RESULTS

Of the selected 219 patients, were 149(68.0%) males and 70 (31.9%) were females in this study.

It has been found that, males are more susceptible to asthma as compared to females (As shown in Table. 1)

Patient distribution based on Age and Gender Table: 1

Gender	No of the Patients	% of the Patients (n=219)
Male	149	68.0%
Female	70	31.9%
Total	219	100%

The WHO's core drug prescribing indicators (n=219)

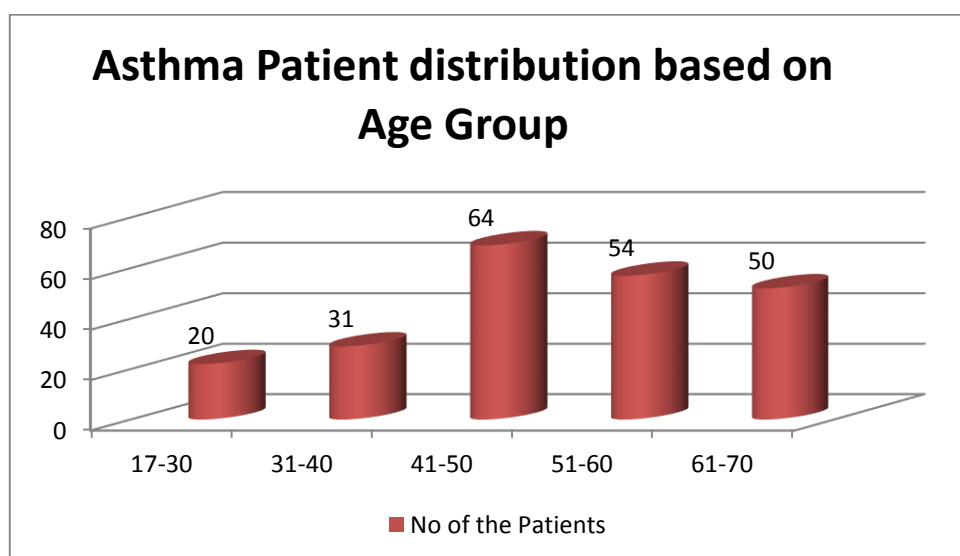
The socio-economic status of the asthmatic population represented in this study was as follows: 63 (28.7%) were grade I employees, 58 (26.4%) were grade II, and 98 (44.7%) were grade III employees. The percentages of the patients who received either monotherapy or combination therapy, i.e., two, three, four, or five drug regimens, showed that 18.7% of all the patients were treated with a single anti asthmatic drug and 81.2% of the patients were treated with anti-asthmatic drug combinations [Table 2].

According to results in Table 2, most patients in this study are found to be between ages of 41-70years with most of them are between age of 61-70years (50 patients). In this study as

shown in Table 2, gender distribution of study subjects has found that males (68%) are more prone to develop asthma than females (31.9%).

Asthma Patient distribution based on Age Group Table: 2

Age of years	No of the Patients	% of the Patients (n=219)
17-30	20	9.13
31-40	31	14.1
41-50	64	29.2
51-60	54	24.6
61-70	50	22.8
Total	219	100



Social History:

Among all the patients involved in this study 28% were found to be alcoholic, 32% were Smoker, 38% were nonvegetarians. (As shown in table. 3)

Social history	No of Patients	Percentage of patients
Alcoholic	62	28.3
Smoker	59	26.9
Non-vegetarians	98	44.7

Out of 219 study subjects, 104 received oral anti-asthmatics. Most commonly 5 classes of drugs are observed to be given very frequently. These are: salbutamol, methyxanthines (deriphylline and doxofylline), Bromhexine, Ambroxol) montelukast and prednisolone. Out of these five drugs methyxanthines (deriphylline and doxophylline) are most commonly used drugs (101 subjects)

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all the patients were treated with a single anti asthmatic drug and 178 (81.3%) of the patients were treated with anti-asthmatic drug combinations.

**Most commonly prescribed Anti-asthmatic drugs: Table: 4
 Monotherapy and combination therapy used (%):**

a) The pattern of drug prescription for treating asthma at the study showed that Methylxanthaine are the highest prescribed class of medications (46.1 %) followed by short acting β 2-agonist (SABA) (20.5%), corticosteroids (16.8 %) ,Anti-histamines(7.7%) leukotriene modifiers (5.0 %) and Anticholinergics(3.6%) s shown in Table 3

Anti-asthmatic drugs prescribed in Monotherapy Table: 4

Anti-asthmatic drugs	No of prescriptions	Percentage of patients
Methylxanthaine	101	46.1
Short acting β 2 agonist	45	20.5
Anti-histamines	17	7.7
Corticosteriods	37	16.8
Leukotriene antagonist	11	5.0
anticholinergics	8	3.6

b) **Combination therapy used:** In the Monotherapy Methylxanthaine is found to be mostly prescribed. In Combination therapy Theophylline-Etophyllin(48%),Beclomethasone-salbutamol(27%)theophylline-Salbutamol(18%) Sabutamol-Fluticasone(7%)combination (Theophylline-Etophylline) is found to be mostly prescribed.

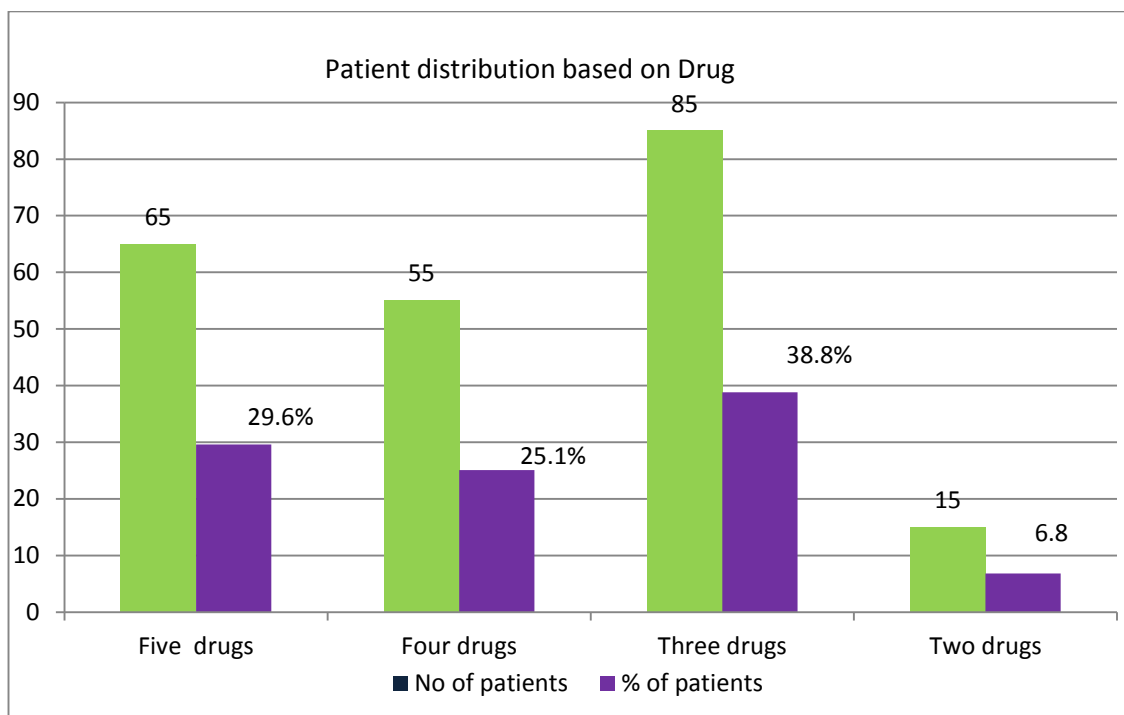
Combination therapy used: In the Monotherapy Methylxanthaine is found to be mostly prescribed. In Combination therapy Theophylline-Etophylline combination (Deriphylline Retard) is found to be mostly prescribed. (As shown in table 5)

Anti-asthmatic drugs prescribed in combination therapy Table:4

Anti-asthmatic drugs in combination therapy	No of Prescriptions	Percentage of Patients
Theophylline+Etophylline	115	52.5
Beclomethasone+Salbutamol	59	26.9
Theophylline+Salbutamol	30	13.6
Salbutamol+Fluticasone	15	6.8

Out of 219 patients, majority of them 65(29.6%) received multiple drug therapy (>4 drugs) followed by 4 drugs 55(25.1%), 3 drug 85 (38.8%) and 2 drug 15(6.8%) (As shown in Table:6).

Drug therapy	No of Patients	Percentage of Patients
Five drugs	65	29.6
Four drugs	55	25.1
Three drugs	85	38.8
Two drugs	15	6.8



Routes of Drugs Prescribed (Asthma Medications):

Out of 219 patients prescription 247 asthmatic drugs were prescribed about 48.8% of participants were using Oral route followed by Inhalation route 35.6% and Injections 16.8% the inhalational route delivers more drugs locally in the respiratory tract with fewer side effects.

Routes of asthma drug prescribed as shown in table-7

Route	Frequency	Percent
Oral	104	48.8%
Inhalations	78	35.6%
Injections	37	16.8%

4. DISSCUSSION

The present study was to assess the drug utilization and prescription monitoring in asthma patients. In this study we found that more male (68%) suffered from asthma than the females i.e.,(31.9%).However, similar study conducted by Arumugam V et al, Dehradun at various hospitals in Dehradun has observed that males (64%) were suffering more from asthma than females (36%). Hence the range of difference in number of females than males is larger.^[10] Overall drug utilization in this study showed that Methyl xanthines were the drug of choice for asthmatic patients, probably due to their lower cost findings that were in agreement with those reported by Kumar et al. ^[11].Our study described that 18.7% of the patients were treated with a single anti-asthmatic drug where else 81.3% patients were treated with anti-asthmatic drug combination. The similar study done by Shimpi et al, it was found that the percentage of single drug therapy was little higher than our study where it was 24% and the rest 76% were treated with multiple drug therapy.^[12] This study found that 48.8%, 35.6% and 16.8% of anti-asthmatic drugs were prescribed orally, via inhalation and other by injection. The Inhalation

route causes a high local concentration in the lungs with a low systemic delivery, significantly improves the therapeutic effectiveness and minimizes systemic side effects [13, 14.] We also found that Grade III employees (Gardeners, drivers, laborers, and peons), smokers and Non vegetarians showed a greater incidence of asthma but were unaware about the prescribed anti-asthmatic drugs. During the study it has been found that the wide range of patients suffering from asthma was in the age group of 41-50 yrs old. No drug-drug interaction was noticed among the prescriptions collected from the patients indicates the awareness among the prescribers. It was also noticed that pharmacists usually distributed medicines without giving any written or detailed oral instructions. Our study focuses the prescription trends which may promote proper and rational use of anti-asthmatic drug. Then very few numbers of patients were having the appropriate information about the antiasthmatic drug

Conclusion: Drug utilization evaluation is most important for the promotion of rational uses of drug. Recommendation of various international bodies on asthma will help to improve prescribing practices of physician and make availability of standard guidelines. Our Prospective observational studies were conducted to evaluate the drug utilization, and prescription monitoring to assess the drug interaction and adverse drug effects in asthmatic patients in tertiary care hospital, In tamilnadu. In our study, we observed that the incidence of asthma was more common in males when compared to females. Majority of the patients were from the age group of 41-50 years. Most of the patients were prescribed with multiple drug therapy out of which oral route was the most preferred one. Even though Methyl xanthine was the most commonly prescribed class of drug, they could have been avoided due to their adverse effects and instead could have used other safe anti asthmatics which are available instead of xanthaine

5. REFERENCES

- [1] R.D. Shimpi, P.S. Salunkhe, S.R. Bavaskar, G.P. Laddha, A.Kalam, A. Khalik Patel, Drug utilization evaluation and prescription monitoring in asthmatic patients, *Int. J. Pharm.Bio. Sci.* 2 (1) (2012) 117–122.
- [2] S.Varkey, S. Sen, Prescribing patterns of corticosteroids in Pulmonology Department, *IJPTP* 3 (3) (2012) 334–337.
- [3] J.Predergast (Ed.), *Asthma, Current Medical Diagnosis and Treatment*, 49th ed., Mc Graw-Hill Publishers & Distributors, New York, 2010, pp. 216–240.
- [4] D.P. Pinal, R.K. Patel, N.J. Patel, Analysis of prescription pattern and drug utilization in asthma therapy, *IRJP* 3 (7) (2012) 257–260.
- [5.] Carruthers, A. A. Thrombolytics-a drug utilization review in a district general hospital, *J Clin Pharm Ther* (1997) 22: 335-338.
- [6]. WHO Expert Committee. *The Selection of Essential Drugs*, technical Report Series no.615. Geneva: World Health Organization, 1977.
- [7]. ASHP guidelines on the pharmacist's role in drug-use evaluation. *American Journal Hospital Pharmacy* 1988; 45:385–386.
- [8]. Yinnon AM, Skorohod Y, Schlesinger Y, Greenberg A. Cefuroxime utilization evaluation: impact of physician education on prescribing patterns. *Isr Med Assoc J* 2000; 2:187–191.
- [9]. Hammerman A, Greenberg A, Yinnon AM. Drug use evaluation of ciprofloxacin: impact of educational efforts on appropriateness of use. *J Clin Pharm Ther* 1997; 22:415–420.

- [10] Arumugam V, Kothiyal P, Juyal V, Pandey A, Tripathi P. Drug utilization assessment in asthma therapy through prescription monitoring at Dehradun hospitals. *Indian J Allergy Asthma Immunol.* 2008;22(1):15-8
- [11] Anil K, Tiwari HK, Kulkarni SK. Drug utilization Assessment in Asthma Therapy through prescription Monitoring. *Indian J Hosp Pharmacy* 2004;2:70-2.
- [12] RD Shimpi, PS Salunkhe, SR Bavaskar, GP Laddha, A Kalam A Khalik Patel; Drug utilization evaluation and prescription monitoring in asthmatic patients; *International Journal of Pharmacy and Biological Science.*2012; 2(1): 117-122.
- [13] Johnson CE. Aerosol corticosteroids for the treatment of asthma. *Drug Intell Clin Pharm.* 1987;21:784-90.
- [14] Taburet AM Schmit B. Pharmacokinetic optimization of asthma treatment. *Clin Pharmacokinet* 1994; 26:396-418.

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