

STUDY OF DRUG UTILIZATION PATTERN IN BRONCHIAL ASTHMA AMONG  
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## ABSTRACT

**Objective:** Bronchial asthma (BA) is a chronic inflammatory disease characterized by bronchial hyperresponsiveness & inflammation of bronchioles.<sup>[1]</sup> There is increasing trends in prevalence of bronchial asthma in kids which leads to increase in hospital admissions and absenteeism among children. There are various drugs and treatment modalities available for Bronchial Asthma. This study will evaluate the prescription pattern and improvement in symptoms in Bronchial Asthma patients attending OPD. **Method:** This study included 200 patients of Bronchial Asthma who fulfilled the study criteria and were observed for six months. There prescriptions were collected and analyzed on percentage basis. **Result:** Study shows 53% of children of Bronchial Asthma were of 6-10 years old with only 10.5% has had positive family history. Out of 200 only 29% had well controlled symptoms while 31% were not controlled. Number of drugs were 7 in 35% of prescriptions. Levosalbutamol is the most common prescribed drug in intermittent (60.5%) and in mild persistent asthma (96.9%) budesonide is most common prescribed drug in moderate (90.4%) and severe (52.5%) asthma. Most common preferred route of administration in all type of asthma is oral and inhalational. **Conclusion:** Treatment of Bronchial Asthma is mainly based on  $\beta_2$  agonist and inhaled steroids. Study suggested that we need a rational approach in providing antiasthmatic pharmacotherapy to children inspite of multidrug therapy.

**KEYWORDS:** Antiasthmatic drug, asthma, Paediatric prescription pattern.

## INTRODUCTION

Bronchial asthma is a chronic inflammatory disease characterized by airway constriction, bronchial hyperresponsiveness and inflammation of bronchioles.<sup>[1]</sup> It affects both adult and children. The main symptoms are recurrent occurrence of wheezing, chest tightness, coughing and difficulty in breathing. 300 million people suffer from asthma worldwide and 100 million people will be affected by 2025.<sup>[2,3]</sup> In present scenario there are increasing trends in prevalence of bronchial asthma in kids ranging from 4 to 32% in kids aged 6-7 years and 13-14 years.<sup>[4]</sup> Some epidemiological studies show a mean prevalence of 2.74 among Indian paediatric population.<sup>[5]</sup> So, asthma leads to increase in hospital admissions and school absenteeism in asthmatic children.<sup>[6]</sup>

Being a chronic disease need of clinical control is not only necessary for long term pharmacotherapy but also patient adherence.<sup>[7]</sup> To treatment the global initiative for asthma guidelines suggests antiasthmatic drugs like short acting  $\beta$ -2 agonist, long acting  $\beta$ -2 agonists, corticosteroids, xanthine derivative and leukotriene

receptor antagonist which can be used alone or in combinations.<sup>[8]</sup>

There are various bronchodilators available, but their rational use is quite essential to attain the therapeutic efficacy and safety. According to WHO more than half of the drugs prescribed inappropriately. The rationale use of medicine (RUM) requires that patient is receive medication appropriate for their clinical needs in doses that meet their own individual requirements for an adequate period of time and at the lowest cost.<sup>[9]</sup>

Rational use of drug also requires monitoring of drug utilization pattern. Regular monitoring of prescription helps to assess appropriateness of the therapy and constitute future guidelines. Therefore keeping in mind the RUM we plan our study to evaluate the drug prescription pattern in treatment of bronchial asthma in paediatric patient attending outpatient department.

## MATERIAL AND METHOD

A prospective, observational, non-interventional study conducted in Department of Pharmacology GMC

Azamgarh Uttar Pradesh and Rama medical college, Kanpur, Uttar Pradesh from September 2019 to February 2020.

Asthmatic kids of either sex aged 1-16 years attending out-patient department were included in the study.

Immunocompromised with systemic disorders and co-morbid conditions like tuberculosis, diabetes, renal disease etc. and those unwilling to participate were excluded. Prior ethical approval was taken.

Patients were enrolled in the study only after obtaining informed consent form and assent form. Information like demographic details and details of prescribed drugs were recorded and data was presented in percentages.

## RESULTS

200 asthmatic kids were reviewed during the study.

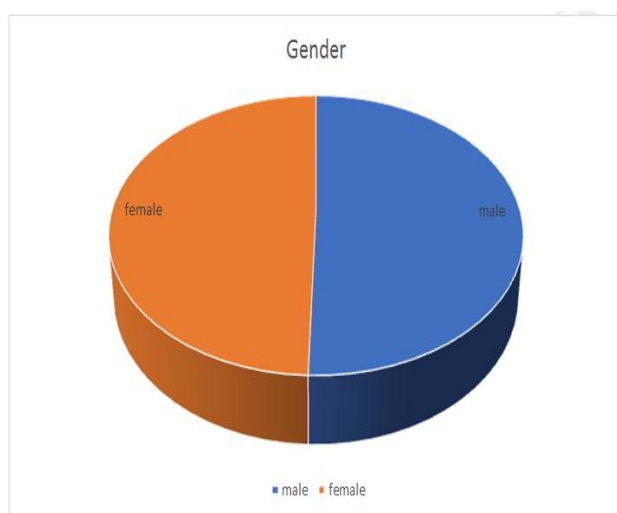


Figure 1: Out of 200 patients 101 were male and 99 were female.

TABLE 1 (N = 200)..

FAMILY HISTORY	POSITIVE	21	10.5%
	NEGATIVE	179	89.5%
SEVERITY OF ASTHMA	INTERMITTENT	86	43%
	MILD PERSISTENT	32	16%
	MODERATE PERSISTENT	42	21%
	SEVERE PERSISTENT	40	20%

Table 1 describes association of family history with asthma where out of 200 patients, 10.5% gives positive family history while 89.5% had no family history of asthma. With respect to severity of asthma, out of total 200 asthmatic kids maximum 43% belongs to intermittent type followed by moderate persistent type 21%, severe persistent type constitutes 20% and mild persistent type constitute 16%.

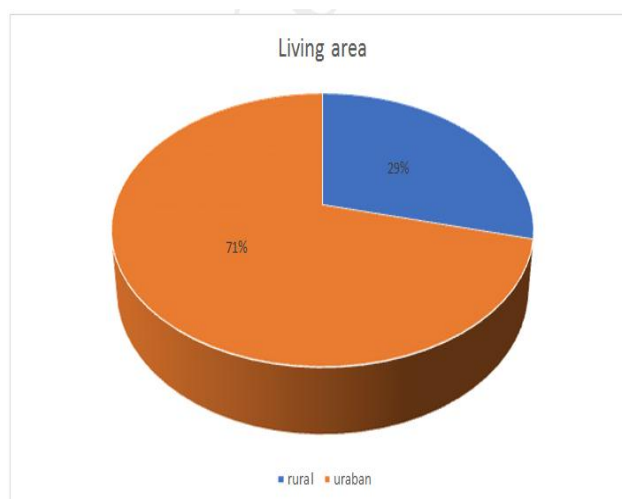


Figure 2: Out of 200 patients, 142 from urban and 58 were from rural area.

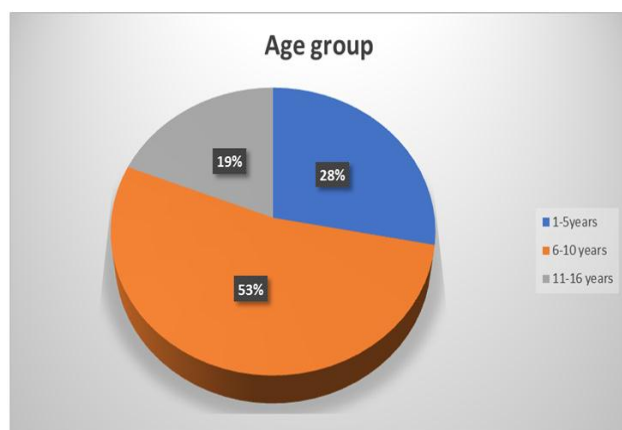


Figure 3 shows age group of asthmatic kids enrolled in the study with maximum no.53% (n=106) patients belongs to age group 6-10 years and minimum 19% (n=38) were in 11-16 years of age group. Rest 28% (n=56) were 1-5 years of age.

TABLE 2 (N=200).

CONTROLLED ASTHMA	WELL CONTROLLED	58	29%
	PARTIALY CONTROLLED	80	40%
	UNCONTROLLED	62	31%

Table 2 shows among 200 asthmatic kids, 40% presents with partly controlled asthma and 31% had uncontrolled asthma while only 29% had well controlled asthma.

TABLE 3.

PRESCRIPTION NUMBER	NUMBER OF DRUGS	PERCENTAGE
69	1	1.4
40	2	5
40	4	10
31	5	16
20	7	35

Table 3 demonstrate number of drugs prescribed per prescription, where 131 prescriptions show multiple drugs prescribed for asthma and only 69 were prescribed with monotherapy, 20 prescriptions show maximum of 7 drugs prescribed which constitute a total of 35%, 5 drugs

were seen prescribed in 31 prescription (16%) followed by 4 drugs in 40 prescription (10%), two drug therapy were prescribed in 40 prescription (5%) and monotherapy was seen in 69 prescriptions (1.4%)

TABLE 4 (N=200) PRESCRIBING INDICATORS.

PARAMETERS	DETAILS
Number of prescriptions analyzed	200
Number of drugs prescribed	712
Minimum number of drugs per prescription	1
Maximum number of drugs per prescription	7
Average number of drugs per prescription	3.8
Drugs prescribed by generic name	0
Drugs prescribed by brand name	100%
Percentage of prescription with antibiotics	45.5%
Single drug therapy	69
Multiple drug therapy	131

200 prescription were analyzed which shows a total of 712 drugs prescribed to asthmatic kids. Average no of drugs per prescription were 3.8 with maximum 7 drugs and minimum 1 drug were prescribed per prescription. All the drugs were prescribed by brand name (100%). In

45.5% prescription antibiotic being prescribed along with anti-asthmatic drugs. Prescription with single drug therapy constitute 69 while multiple drug therapy constitutes 131 as shown in table 4.

TABLE-5.

Generic name of drugs	Intermittent N=86	mild persistent N=32	moderate persistent N=42	severe persistent N=40
Levosalmolamol	52 (60.5%)	31 (96.9%)	28 (66.67%)	24 (60%)
Salbutamol	22 (25.6%)	8 (25%)	10 (23.8%)	12 (30%)
Levosalmolamol + ipratropium bromide	21(24.4%)	6 (18.8%)	12 (28.58%)	16 (40%)
Salmeterol fluticasone +	3 (3.4%)	4 (12.5%)	6 (14.3%)	7 (17.5%)
Budesonide	21(24.4%)	26 (81.3%)	38 (90.47%)	39 (97.5%)
Prednisolone	2 (2.3%)	1 (3.12%)	5 (11.9%)	19 (47.5%)
Montelukast	24 (27.9%)	4 (12.5%)	15 (35.7%)	21(52.5%)

Table 5 show anti-asthmatic drugs prescribed in different types of asthma. In intermittent asthma most commonly prescribe drug was  $\beta_2$  agonist levosalmolamol(60.5%)

followed by montelukast (27.9%) while oral corticosteroid prednisolone was least prescribed(2.3%) drug. In case of mild persistent asthma, levosalmolamol

(96.9%) followed by budesonide (81.3%) were most commonly prescribed drugs. In moderate asthma inhalational corticosteroid budesonide (90.47%) was

most commonly prescribed drug. Budesonide (97.5%) was also highly prescribed in severe persistent asthma followed by leukotriene antagonist montelukast (52.5%)

**TABLE -6 ANTI-ASTHMATIC DRUGS ACCORDING TO ROUTE.**

ROUTE	INTERMITTENT	MILD	MODERATE	SEVERE
ORAL	10	12	16	2
ORAL + INHALATIONAL	56	15	20	16
PARENTERAL + INHALATIONAL	20	5	6	22

Table 6 shows Most commonly preferred route of anti-asthmatic drug administration in all type of asthma was oral +inhalational (56 in intermittent type, 15 in mild, 20 in moderate and 16 in severe type of asthma), Parenteral+Inhalational route most commonly seen in intermittent (20) and severe type (22) of asthma while in case of mild (12) to moderate (16) type of asthma oral route was most preferred.

## DISCUSSION

Drug utilization studies are an important parameter to assess the current therapeutic practice and serve as background for changes and rationalization of disease management to decrease economic and social healthcare burdens. In this study 53% Asthmatic kids are 6 to 10 year and more than 50% are male,<sup>[10]</sup> out of these 70% are living in urban area. More than 70% kids are suffering from asthma because Kanpur city is a more polluted city in India. These finding are similar to studies by Shah et al,<sup>[11]</sup> 2019, Garje et al<sup>[12]</sup> 2014, and Ahmad et al,<sup>[13]</sup> 2017, Robinson et al 201,<sup>[14]</sup>

In our study family history of asthma is present in 10.5%, asthmatic kids. This finding is similar to study by Stephanie J et al 200<sup>[15]</sup> there is 12.1% asthmatic kids having family history.

In this study majority of asthmatic kids were suffering from intermittent asthma and this finding is similar with study conducted by Ahmad et al 2017.<sup>[13]</sup> On the other hand, study conducted by Garje et al 2014<sup>[12]</sup> majority of asthmatic kids had mild persistent asthma. This can be due to geographical and climate difference. In our study asthma in majority of the asthmatic children was partially controlled (40%). Urbanization and pollution are an important factor for asthma in children which can be credit to increased level of pollution and dietary changes.<sup>[14]</sup> So, in our study more than 70% asthmatic kids were from urban areas.

The average number of drugs per prescriptions was 3.8 which is higher than the ideal standard 1.6 to 1.8<sup>[16]</sup>. Many other studies like Garje et al (2.97),<sup>[12]</sup> Shah RD et al (6.10),<sup>[11]</sup> and Kumar VB et al (3.5)<sup>[17]</sup> had also observed a higher value at the same. None of the drug was prescribed by generic name which is irrational. This can be due to lack of awareness and negative perceptions about generic prescribing as well as undue influence of

pharmaceutical companies among health care professionals (Hassali MA).<sup>[18]</sup>

In our study percentage of prescriptions with antibiotics are 45.5. This shows unnecessary use of antibiotics & increase the cost of therapy and also responsible for antibiotics resistance.

In spite of that, study conducted in the past showed concurrent prescriptions of antibiotics and antiasthmatic drugs in paediatric population. (De Boeck k et al,<sup>[19]</sup> Mongione Smith R et al 2011).<sup>[20]</sup>

In our study prescription with antibiotics 45.5% which is higher as compared to the standard value of 20-26.8%. This indicate that rationality in prescription among health care professionals are not appropriate.

In our study prescription with multiple antiasthmatic drug was very high (65.5%) which suggests adherence to standard treatment guidelines. These findings are similar with study conducted by Karki et al,<sup>[21]</sup> Garje et al<sup>[12]</sup> and Prasad et al.<sup>[22]</sup> Among the kids treated with multiple drug therapy  $\geq 2$  drug combination was prescribed in 131 prescriptions. In contrast some studies preferred  $\geq 3$  drug combination of antiasthmatic drug.<sup>[12,21,22]</sup>

According to treatment guidelines for asthma inhalation therapy should be the first choice because it enables local delivery of drugs and minimises systemic side effects.<sup>[23]</sup> In our study asthmatic kids were mainly prescribed oral plus inhalational form ie 53.5%, which is similar with Trivedi et al.<sup>[23]</sup> The inhalational therapy among asthmatic kids suggests awareness among kid and their parents as well as by the treating physician.

In our study most commonly, prescribed drug is  $\beta_2$  agonist levosalbutamol followed by Montelukast and inhalational corticosteroids. Comparatively other Antiasthmatic drugs were used less. The usage of  $\beta_2$  agonist levosalbutamol resembles with study like Garje et al<sup>[12]</sup> Shah et al<sup>[11]</sup> and Kumar et al.<sup>[17]</sup> On the other hand, study of Trivedi et al.<sup>[23]</sup> prescribed methyl xanthine the most.  $\beta_2$  agonist like levosalbutamol are preferred bronchodilator due to their rapid onset of action and easy availability but their frequent administrations suggest poor control of asthma and there is need of controller therapy.<sup>[24]</sup>

GINA guidelines recommend the use of controllers like inhalational corticosteroids in persistent asthma to prevent severe exacerbations, reduce hospitalisations and death. So inhaled corticosteroids (budesonide) were prescribed more in children with persistent asthma in this study.

Another significant finding was that Asthmatic kids with intermittent asthma received Montelukast as compared to those with persistent asthma (mild and moderate). It's rapid onset of action and excellent safety profile provides a sound rationale for its use in intermittent asthma in kids.<sup>[25]</sup> A study by Bisgaard et al<sup>[26]</sup> also observed a favourable effect of using Montelukast in 2-5 years old kids diagnosed with mild intermittent asthma.

A short course of oral steroids may be effective as add on therapy in severe persistent asthma kids with poor symptoms control (according to global initiative for asthma 2019)<sup>2</sup> in our study as compared to intermittent asthma, Asthmatic kids with severe persistent asthma received oral prednisolone more frequently.

In our study Antihistaminic, cough suppressants, nasal decongestants, etc. were used less that indicates awareness among physicians regarding standard treatment guidelines.

## CONCLUSION

This study analysed prescription pattern in outpatient department which will differ from drug use in admitted Asthmatic kids. The study also lacks documentations of asthma action plan and control drug use. Despite these limitations the present study contributes to the understanding of usage of Antiasthmatic drug among Asthmatic kids and healthcare prescribers should be encouraged to attend regular continuing medical education (CME) and workshops to update their knowledge regarding revised treatment guidelines. Healthcare professionals needed to be well trained with the current treatment guidelines. Only matter of concern is prescribing with brand names. Promotion of educational strategies and programmer will incur awareness about benefits of prescribing generic drugs.

The finding of study suggested a rational approach in providing Antiasthmatic pharmacotherapy to children and can form a basis to develop future studies as well as design information that would improve management of paediatric asthma.

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