



## **A Prospective Study of Adverse Drug Reaction in Patients with Asthma Prescribed in a Tertiary Care Hospital**

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### **ABSTRACT**

*A tertiary care hospital's respiratory department supplied anti-asthmatic drugs to patients who had asthma, and the goal of the current study was to describe the types and severity of adverse drug responses in such individuals. Methodology: from September 2021 to April 2021, a study on adult patients with bronchial asthma was conducted. Over a 7 month period. Following approval from the human ethics committee, 469 prescriptions were chosen after 894 were screened in accordance with the inclusion criteria for analysis. Information on negative drug reactions was included in the Naranjo scale for causality assessment (ADR). Results: Most of the patients in our study were between the ages of 61 and 70.64.3 percent were male and 35.6 percent were female. The most often prescribed class of anti-asthmatic medications was beta 2 agonists. Elderly females were more likely to experience negative drug reactions. The tremor was most frequently occurring adverse drug reaction. The majority of the cases fell into the mild category on Naranjo's scale for assessing causality. Conclusion: According to our study, men were more likely than women to experience asthma attacks. 32.4% of patients experienced adverse drug reactions, while elderly males experienced these reactions more frequently. The most frequently reported ADR is tremor. As measured by the Naranjo scale.*

**Keywords:** Polypharmacy, causality assessment, and adverse drug events

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### **INTRODUCTION**

A serious health and socioeconomic problem, asthma is a chronic respiratory disease that affects more than 300 million people worldwide. According to current theories, it is an inflammatory airway illness that results in airway obstruction, hyper responsiveness, increased mucus production, and remodelling of the airway walls. [1]. An ongoing but treatable obstruction of the airways is bronchial asthma. Studies show that asthma affects anywhere from 1% to 20% of people worldwide[2]. Since it would take several generations for changes to our genetic composition to become apparent, the rise in asthma prevalence over the past 25 years is most likely the result of changes in lifestyle or environmental factors. [3]. Asthma cases are increasing internationally at a rate of 50% every decade, according to the World Health Organization, and by 2020 it will surpass chronic obstructive pulmonary disease (COPD) as the third greatest cause of mortality. According to estimates, there are already 300 million asthma sufferers worldwide, and that number could increase to 100 million by 2025[4]. The National Family Health Survey 2 (Nfhs-2) report claims that, there are 2468 asthma cases for every 100,000 people in India. The number of asthmatics will significantly increase, WHO defines an adverse drug reaction as "a response that is noxious and undesired and that occurs at levels commonly employed in humans for the prophylaxis, diagnosis, or therapy of disease, or for the alteration of physiological function"[6]. Drugs can be incredibly beneficial and enhance quality of life by easing symptoms and promoting a sense of wellness. As medical advancement and the creation of new pharmaceuticals continue, there is a chance that the number of

ADRs will rise. [7]. Even when used properly, the majority of drugs have some side effects and the potential to harm users. Because commonly used medications alter one or more aspects of cellular and molecular function, they all run the risk of causing reactions that aren't always wanted [8]. As a result, the goal of pharmacotherapy cannot be to prescribe a course of treatment that is risk-free; rather, it should focus on ensuring that the risks connected with drug therapy are maintained to a minimum. The right information regarding drug side effects aids doctors in prescribing medications while weighing the advantages and risks. ADR. Affects 10–15% of all patients receiving medications. Serious ADRs occur at a rate of 6.7%. The 5 to 9% of hospital costs that are related to managing ADR accounts for these costs. ADRs health issue because they make up a considerable amount due to its chronic nature and increased likelihood of noncompliance with medication, bronchial asthma is significant.

## MATERIAL AND METHODS

### STUDY DESIGN:

A future observational study was conducted for the project.

### STUDY PARTICIPANTS:

469 asthmatics who had received therapy were included in the study.

### STUDY CRITERIA:

- **INCLUSION CRITERIA**

Patients between the ages of 16 to 75 years diagnosed with asthma patients taking anti-asthmatic drugs were comprised of the study.

- **EXCLUSION CRITERIA**

Patients under the age of 16 years who were pregnant or nursing women, patients with asthma and patients who had diabetes, heart disease or hypertension, bronchitis, COPD, peptic ulcers, diabetes mellitus, and all additional co-morbid conditions were disregarded.

### STUDY PROCEDURE:

The study's goals were described in terms of medicine to patients with bronchial asthma who were receiving therapy with anti-asthmatic medications at the out-patient department of the institutional ethics committee and human ethics committee. Those who agreed to take part in the study gave their formally signed informed permission. The ADR reporting form was used to record the following parameters relevant to the study, and the severity of ADR was assessed using Naranjo's scale and recorded.

## RESULTS

302 (64.3%) males and 167 females with asthma were chosen from a total of 469 participants in our study.(35.6%) belonged to female patients, as seen in table 1. The findings of our study demonstrate the patients' age-based distribution. Nearly all of the patients were in the after the 61–70 age group comes the 51–60 age group. Older age had a higher incidence as demonstrated by table 2.

### PATIENT DISTRIBUTION BASED GENDER

**Table: 1 Gender-based distribution**

Gender	No. of patients	Percentage
Male	302	64.3%
Female	167	35.6%
Total	469	99.9%

**Table: 2 Distribution by age group**

Age group	No. Of patients	Percentage
17-30yrs	39	8.3%
31-40yrs	65	13.8%
41-50yrs	65	22.3%
51-60yrs	99	21.1%
61-70yrs	161	34.4%
<b>Total</b>	<b>469</b>	<b>99.9%</b>

Table 3 displays the anti-asthmatic drug prescribing trends. According to available data, corticosteroids were the asthma drugs that were most frequently prescribed, followed by methylxanthine and beta 2 agonist.

**Table: 3 Pattern of anti-asthmatic medication prescription**

Anti-asthmatic drugs	No. of patients	Percentage
Beta 2 agonist	233	49.6%
Methylxanthine	113	24.1%
Corticosteroids	123	26.2%
<b>Total</b>	<b>469</b>	<b>99.9%</b>

**Table: 4 Proportion of patients who have ADR**

ADR	No. of patients	Percentage
Patients with ADR	152	32.4%
Patients without ADR	317	67.5%
<b>Total</b>	<b>469</b>	<b>99.9%</b>

Tremors (33.4%) were the most common adverse drug reaction (ADR) in the beta 2 agonist group, followed by nervousness (23.2%), headaches (13.3%), palpitations (20.1%), insomnia (6.5%), and dizziness (3.5%). Most common antagonist in beta 2.

**Table: 5 Beta 2 agonist unpleasant drug reaction**

ADR	No. of patients	Percentage
Tremors	78	33.4%
Nervousness	54	23.2%
Headache	31	13.3%
Sleeplessness	15	6.5%
Palpitations	47	20.1%
Dizziness	8	3.5%
<b>Total</b>	<b>233</b>	<b>100%</b>

The methylxanthine-related adverse medication response that occurred the most frequently was nausea (32.7%), which was followed by palpitations (23.9%), vomiting (18.6%), headaches (16.8%), and insomnia (7.9%).

**Table: 6 Adverse drug reaction of methylxanthine**

ADR	No. of patients	Percentage
Nausea	37	32.7%
Vomiting	21	18.6%
Headache	19	16.8%
Palpitation	27	23.9%
Insomnia	9	7.9%
<b>Total</b>	<b>113</b>	<b>99.9%</b>

**Table: 7 Adverse drug reaction of corticosteroids**

ADR	No. of patients	Percentage
Mouth ulcer	41	33.4%
Epigastric pain	25	20.3%
Myalgia	24	19.5%
Vomiting	19	15.5%
Mood change	14	11.3%
<b>Total</b>	<b>123</b>	<b>100%</b>

According to this assessment, 56% of adverse medication reactions are likely to be caused by other factors, 34% are possible, and 10% are certain.

**Table 8: The Naranjo Scale for Determining the Causality of Adverse Drug Reactions**

S.NO	Categories	Score	No. of Cases
1	Definite	>0	-
2	Probable	5-8	56%
3	Possible	1-4	34%
4	Doubtful	0	10%

**NARANJO ALGORITHM**

S. No	Questions	Yes	No	Don't know	Score
1.	Exist any authoritative reports on this reaction from the past?	+1	0	0	1
2.	Has the suspected drug been used since the adverse event first appeared?	+2	-1	0	2
3.	Did stopping the medication or using a specific antagonist make the side effect better?	+1	0	0	1
4.	Did the adverse drug reaction return after the medication was delivered	+2	-1	0	0

	again?				
5.	Are there any additional factors (not related to the medication) that might have contributed to the reaction?	-1	+2	0	2
6.	When a placebo was administered, did the reaction come back?	-1	+1	0	0
7.	Was the substance found in known hazardous amounts within the blood (or other fluids)?	+1	0	0	0
8.	Did a higher dose cause a more severe reaction, or did a lower dose cause a milder one?	+1	0	0	0
9.	Had the patient ever been exposed to the same or a substance that was similar and had a similar reaction?	+1	0	0	0
10.	Was there any verifiable evidence to support the adverse event?	+1	0	0	0
Total					6

(Naranjo *et al*, "A method for estimating the probability of adverse drug reactions", *clin, pharmacol, ther*, August 1981)

The adverse drug reaction is categorised into one of the following probability groups based on the final score:

Definite >8

Probable 5 to 8

Possible 1 to 4

Doubtful <1

For inter-rater agreement, kappa ranges from 0.69 to 0.86, which is equivalent of 83% to 92% agreement. Intra-rater reliability ranges from 80% to 97%,  $k = 0.64$  to 0.95. When doctors evaluated a separate set of prospectively collected instances of adverse medication responses, the results were the same and the inter-rater agreement was still maintained, indicating concurrent, content, and consensual validity.

## DISCUSSION

At a tertiary care hospital in Tamil Nadu, our prospective study, which examined adverse drug reactions among asthma patients, was conducted. In our study, adverse drug reactions were assessed in a total of 469 patients. In this, the majority of the patients ranged in age from 61 to 70 years. The gender split was 64.3% male and 35.6% female. Salbutamol, a beta 2 agonist, was the most anti-asthmatic medication frequently prescribed. 43% of the 152 patients who were using anti-asthmatic medication out of the 469 patients had at least one negative drug reaction. Negative medication responses occurred more typically in older males. The most frequent adverse drug reactions reported were tremors in the beta 2 agonists. About 56% of adverse drug reactions have a probable cause. According to the scale used to determine the causality of ADRs, 56% of the cases are likely, 34% are possible, and the remaining 10% are certain. The majority of the ADRs (92%) were mild. The pattern of adverse drug reactions reported in our study's findings are consistent with those of studies by Kallergis *et al.* [10], Balaji *et al.* [11], and others. Kaminstein *et al.* [13], Carter *et al.* Beta 2 agonist was the most frequently recommended antidepressant group of drugs for asthma. 32.4% of patients experienced adverse drug reactions, and these reactions were more prevalent in older males who have undergone drug therapy. The 61-70 age bracket (34.4%). The prevalence of ADRs was higher in people aged 51 to 60 (21.1%). The most frequently reported ADR is tremor.

## CONCLUSION

In our study, we found that men had an increased incidence of asthma compared to women. 32.4% of patients experienced adverse drug reactions, while elderly males experienced these reactions more frequently. The most frequently reported ADR is tremor. As stated by the Naranjo scale, future research studies to examine the same among asthma patients will be needed. Inappropriate medicine prescriptions can have detrimental effects, pose a significant burden to medical personnel, raise morbidity and mortality, and lower patients' quality of life. Thus, the clinical pharmacist can play a significant role in recognising and treating the adverse medication reaction through comprehensive pharmaceutical care.

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