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STUDY ON PRESCRIPTION PATTERN AND RISK FACTORS IN ADULT ASTHMA PATIENTS

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ABSTRACT

Background: Asthma is defined as a chronic inflammatory disorder of the airways causing bronchi to swell and narrowing of airway. It is associated with recruitment of inflammatory cells and the clinical development of wheezing, shortness of breath, chest tightness, and cough. **Objective:** Study on Prescription Pattern and Risk Factors in adult Asthma Patients. **Methods**: A descriptive study was conducted. Data collection consisted of recording demographics, risk factors and treatment using the pulmonary medication. The collected data was entered separately assigning the respective variables, labelling and values for the categories in Microsoft Excel 1997-03. **Result and Discussion**: The study conducted at Norvic International Hospital (NIH) showed that majority of patients were female, out of 110 patients, 62 were female and 48 were male which implies females were more susceptible to asthma. The age group mostly affected was 50-59years. Most of the patients were diagnosed with mild asthma followed by moderate asthma. From the above study it was found that common risk factors for the development of disease was exposure to cold air, exposure to dust, past history, smoking. Beta2 adrenoceptor agonist (SABA- short acting beta 2 agonist) i.e. Salbutamol was most commonly prescribed drug followed by Corticosteroids for the treatment of asthma in adults. The study showed that Beta2 adrenoceptor agonist (LABA- long ating beta 2 agonist, Formoterol) combination with Corticosteroids (Budesonide) was most commonly prescribed drug in combination. The widely utilized dosage form was inhalers followed by tablets. Thus, this study focused on analyzing risk factors as well as prescription pattern on asthma in adults.

KEYWORDS: Asthma, demographic pattern, cold exposure, Salbutamol.

INTRODUCTION

Asthma is defined as a chronic inflammatory disorder of the airways causing bronchi to swell and narrowing of airway. It is associated with recruitment of inflammatory cells and the clinical development of wheezing, shortness of breath, chest tightness, and cough. Asthma is a major public health issue.[1] Inflammation in asthmatic airways not only involves the trachea and bronchi but also extends to the terminal bronchioles and parenchyma. Inflammation needs to reach a certain threshold to result in symptoms. The degree of inflammation does not relate to asthma severity but relates to airway hyper responsiveness.[2]

Presently, asthma is a major chronic disease affecting approximately 334 million people worldwide. Prior studies have shown that the prevalence of asthma ranges from 15% to 20% in many countries, especially in the developed nations.[3]

The Global Initiative for Asthma (GINA) aims to improve the diagnosis, management, and prevention of asthma by providing an up-to-date evidence-based strategy and tools and practical resources for clinicians worldwide. The goals of asthma management are to achieve good symptom control, relieve symptoms when they occur, and minimize the risk of exacerbations and asthma-related death, persistent airflow limitation, and side effects of treatment.[4] Therefore, patient education and evaluation of risk factors plays crucial role in the prevention and treatment of asthma.

The objective is to study prescription pattern and risk factor in adult Asthma patients. The specific objective are

1. To study the demographic pattern of adult asthma patients.
2. To study the prescription pattern of drugs used in asthma patients.

3. To find the risk factors leading to the disease.

MATERIAL AND METHOD

Study area: The study was conducted in Norvic International Hospital, Thapathali.
Study Duration: The study was completed within 3 months (2078/11/10 to 2079/02/12).
Research Design: Descriptive design in which retrospective data was used.
Type of study: Hospital based study.
Sampling Technique: Purposive sampling technique
Study variables: Prescription pattern, demographic variables, risk factors
Sample size: 110 samples [2020(August)-2022(March)].

Criteria for sample selection

- **Inclusion criteria**: Adults of specific age group
- **Exclusion**: Those data which are not approved by department. Other respiratory disorders like COPD, Pneumonia.

Data collection tools: Data was collected through files using discharge summary, patient's medication records, computer data, etc.

Data analysis and management: Necessary editing was done immediately after data collection. Data entry and analysis was performed using MS-EXCEL .In-depth interview was shared among supervisors and others if needed to draw common issue.

Ethical Consideration: Approval and permission from the institutional review board of concerned hospital and approval from National Model College for Advance Learning (NMCAL) was taken before the study. The researcher collected data from past records of patients under approval from Medical Record Department (MRD). All patients' data were kept confidential. All the research activities were carried out under the supervision and guidance of supervisor.

RESULT AND DISCUSSION

1. Demographic Pattern and Risk Factors of the patient

1.1 Distribution of patients according to their gender

In this study, out of 110 sample size, [62(56.36%)] were female patients and [48(43.64%)] were male patients in which percentage of female patient is comparatively more. A study conducted on: "Asthma and gender: The Female lungs", a study by Pignataro F.S et al[5] found that asthma has a higher incidence in females, particularly at certain stages of pubertal development. Moreover, women seem to experience more asthma symptoms than men and to use more rescue medications, resulting in a reduced quality of life.

This difference is usually attributed to female's gender exposure to risk factors for asthma.

Table 1: Distribution of patients based on gender.

Gender	Frequency	Percentage
Male	48	43.64%
Female	62	56.36%
Total	110	100%

1.2 Distribution of patient according to their age

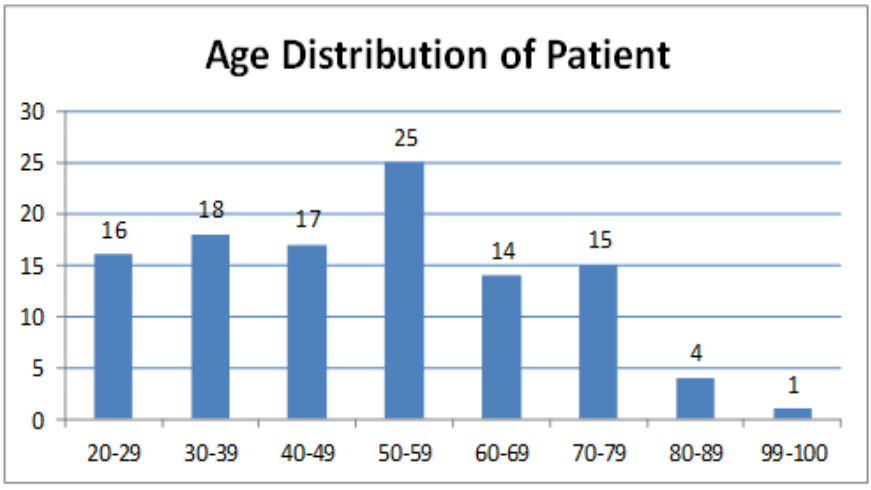


Figure 1: Distribution of patient according to age.

In this study among 110 patients, the data was divided into 8 age ranges (groups). The majority of the patients belonged to 50-59years i.e. 22.72% and the lowest number of patients were in age group 90-99 years i.e. 0.91%. The population of male group was larger than female group in the age group of (50-59) i.e. [14(12.73%)]. The mean age is 50.58 year. A similar result was observed in the study conducted by Gillman and Douglass (2012) which explained mortality and morbidity statistics suggest that older people suffer disproportionately from the burden of asthma and airways disease with the majority of those dying from asthma aged over 55 years.[6]

1.3 Distribution of patients according to the type of asthma

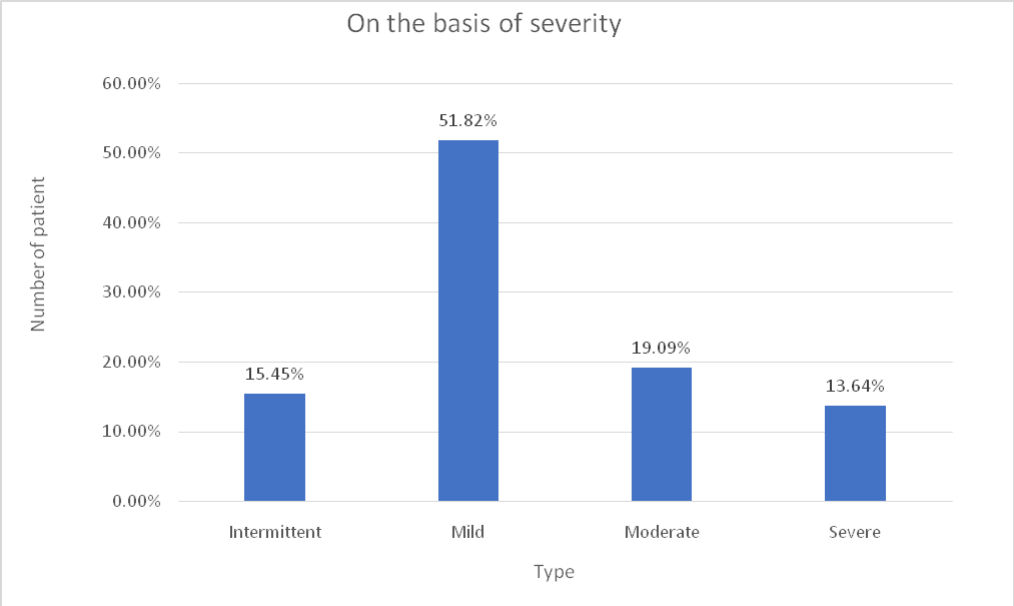


Figure 2: Patient Distribution according to disease type.

The study showed that the highest number of patients diagnosed with asthma was of type Mild-persistent on the basis of severity. The total number of patient suffering from asthma was [57 (51.82%)].

In contrast, the study done by Miller et al in 2005 showed that asthma severity was associated with asthma-related health care use, and patients considered to have severe asthma according to both sets of guidelines and physician's assessment had the highest health care and medication use.[7]

1.4 Distribution of patients according to the risk factors

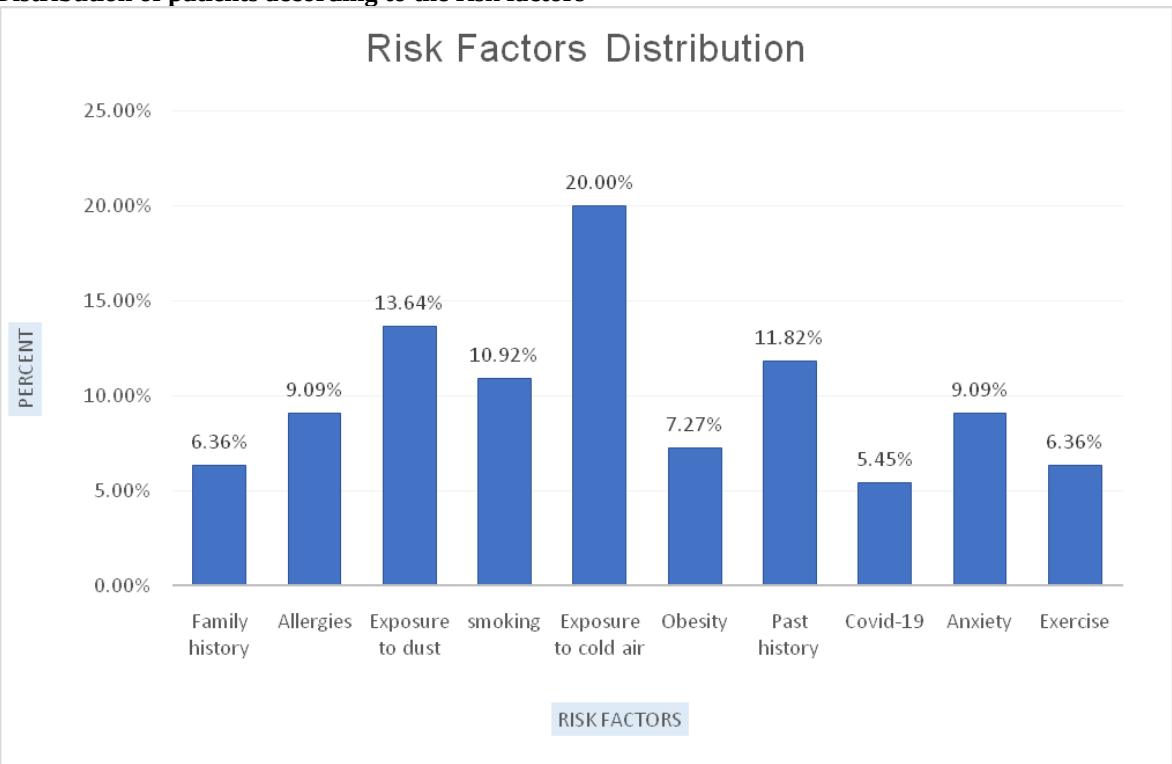


Figure 3: Distribution of Patient according to risk factor.

In the study among 110 patients, Exposure to cold air was the important risk factor with [22(20%)]. Similarly, exposure to dust [15(13.64%)], Past history [13(11.82%)], Smoking [12(10.92%)], Allergies [10(9.09%)], Anxiety factors [10(9.09%)], Obesity

[8(7.27%)], Family history [7(6.36%)], Exercise [7(6.36%)], Covid-19 [6(5.45%)].

Cold air increase airway obstruction and neutrophilic airway inflammation which leads to broncho constriction.[8]

In this study, total risk factors comprising exposure to cold air was [22(20%)]. Similar findings was seen on the retrospective study conducted by Saxena et al, data from Mild cool air--a risk factor for asthma exacerbations: results of a retrospective study where Exposure to cold air was the important risk factor besides the other risk factors of asthma exacerbations.[9] Similary, exposure to dust is a second most common risk factors of asthma which accounted for [15(13.64%)] of the risk factors of asthma. In the study conducted by Xu et al, the data from Occupational and Environmental Risk Factors for Asthma in Rural Communities in China had suggested that after stratification of the subjects by dust type, the estimated ORs for wheezing were 1.58 (95% CI: 1.02–2.44) among the group exposed to inorganic dust and 3.03 (95% CI:1.25–7.33) among the group exposed to metal dust. In contrast, Asthma was not shown to be significantly associated with any specific dust type.[10]

In present study, allergies accounts for [10(9.09%)] of the risk factors of asthma. The association between atopy and asthma appears specific to inhalant allergens. There is a difference between allergic asthma with asthma symptoms induced by exposure to a defined allergen, and asthma in a subject characterized as 'sensitized' with no relation between allergen exposure and clinical reaction.[11]

In this study, Anxiety factors accounts for [10(9.09%)] of the risk factor for asthma. A study conducted by Katon et al, the data from the relationship of the asthma and anxiety disorders had suggested that; In adult populations with asthma, the estimated rate of panic disorders ranges from 6.5% to 24%. This study is compatible to above study as 9.09% lies between the range of 6.5%-25%.[12]

In this study, Obesity accounts for [8(7.27%)] of the risk factor. Obesity plays an important role in the development and progression of respiratory diseases. In asthma, obesity is considered a major comorbidity that exacerbates respiratory symptoms. It is also well established that asthma associated with obesity is a phenotype with more difficult-to-treat asthma compared to non-obese subjects.[13] Weight loss is associated with a .universal improvement of asthma and should be part of asthma management in the obese patient.

Family history (FH) is one of the predictors of asthma risk usually caused by genetical disorders. In present study family history accounts for [7(6.36%)] of the risk factor. Genetics also play an important causative role, as indicated by familial aggregation and the identification of candidate genes and chromosomal regions linked to asthma risk.[14] In the similar study conducted by Liu et al, the data from "The association between family history of asthma and the prevalence of asthma among US adults" had suggested that a family history of asthma is an important risk factor for asthma and that familial risk assessments can help identify people at highest risk for developing asthma.[15]

Exercise-induced asthma is a condition in which vigorous physical activity triggers acute airway narrowing in people with heightened airway reactivity. A more accurate description would be exercise-induced bronchospasm. In present study total Exercise induced asthma accounts for the [7(6.36%)]. In the study conducted by McFadden and Gilbert, the data from The Relationship of Asthma and Anxiety Disorders had suggested that Exercise-induced asthma is usually easy to treat. Success is achieved by controlling the symptoms that follow specific activities.[16]

In this study, Covid-19 accounted for 5.45% of the risk factors for asthma. A similar study was conducted by Hussein et al, the data from Asthma and COVID-19; different entities, same outcome studied that the prevalence of asthma was 11.2% among COVID-19 patients who attended the hospitals.[17]

2. Prescription pattern of the drugs used in treatment of asthma

2.1 Main categories of drugs prescribed

Table 2: Main Category of Drugs.

S.N.	Drug classes	Frequency(N)	Percent(%)
1.	leukotriene receptor antagonist(LTRAs)	46	41.82
2.	Anti-histamines	68	61.82
3.	Beta agonist+ Corticosteroids	64	58.18
4.	Corticosteroids	69	62.73
5.	Beta2 adrenoceptor agonist	98	89.09
6.	Anti-Cholinergic	25	22.73
7.	Expectorants	29	26.36
8.	Beta Lactam	64	58.18
9.	NSAIDs	47	42.73
10.	Anti-Depressants(SSRI)	32	29.09
11.	PPIs	68	61.82
12.	Methylxanthines	12	10.91

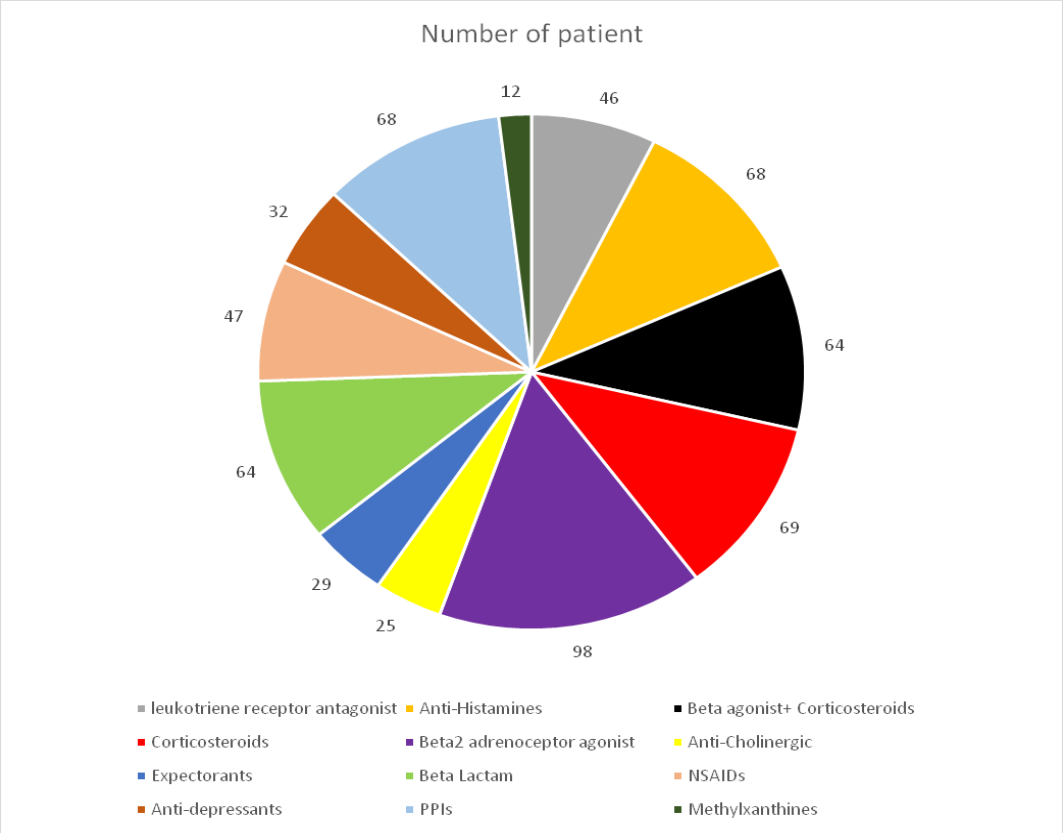


Figure 4: Category of Drug Prescribed in each patient.

2.2 Individual Classes of Drug Prescribed.

Table 3: Individual Classes of drug prescribed.

S.N.	Main class of drugs	Individual class of drugs	Frequency(%)
1.	Leukotriene receptor antagonist (LTRAs)	Montelukast	46 (41.82)
2.	Anti-histamines	Levocetrizine Fexofenadine	14 (12.73) 54 (49.40)
3.	Beta agonist+ Corticosteroids	R/C(Formoterol+Budesonide)	64 (58.18)
4.	Corticosteroids	Prednisolone R/C Beclomethasone R/C Budesonide	20(18.18) 22(20) 27(24.55)
5.	Beta2 adrenoceptor agonist	R/CSalbutamol (SABA) R/C Salmeterol (LABA)	75(68.18) 23(20.91)
6.	Anti- Cholinergic	NebulisationwithIpratopium Bromide R/C Tiotropium bromide	8(7.27) 17(15.45)
7.	Expectorants	Terbutaline Sulphate+ Bromhexine hydrochloride (Grilinctus) Guaifenesin+ Terbutalin+ Bromhexine(Bronchosolvin)	19 (17.27) 10 (9.09)
8.	Beta lactam	Cefpodoxime Cefuroxime Amoxicillin+ Clavulanic acid	22(20) 18 (16.36) 24(21.82)
9.	NSAIDs	Acetaminophen/ Paracetamol Aspirin	35 (31.82) 12 (10.91)
10.	Anti-Depressants (SSRI)	Escitalopram Clonazepam	8 (7.27) 24 (21.82)
11.	PPIs	Pantoprazole Rabeprazole Esomeprazole	37 (33.64) 12 (10.91) 19 (17.27)
12.	Methylxanthines	Theophylline	12 (10.91)

Beta2 adrenoceptor agonistwas given to maximum patients [98(89.09%)] which was frequently used in our current study. The most used Beta2 agonist was Salbutamol [75(68.18%)] which is SABA. But in the study performed by Pandey et al, the results suggested that Beta-agonist (40%) were the most frequently prescribed anti-asthmatic, which is rational with this study as they were most frequently used[18]; which was lesser than in our study.

In present study, inhaled corticosteroids steroids were given i.e. R/C Beclomethasone [22(20%)] and R/C Budesonide [27(24.55%)] even in mild disease which helps in improving symptoms. This study follows GINA guidelines in which inhaled coticosteroids is rational per guidelines.[19]

In our study anti-histamines were prescribed to the patients [68(61.82%)] in which [14(12.73%)] patients were prescribed Levocetrizine; but in a study conducted by Holgate and Finnerty, the efficacy of cetirizine may extend beyond H 1 -receptor blockade to inhibit some of the chronic (and perhaps more important) cellular events in asthma[20] which was similar with our study.

In our study, among 110 patients, the leukotriene receptor antagonist was prescribed to [46(41.82%)] patient in general. Montelukast is usually prescribed to protect patients against exercise induced broncho-constriction and patient having mild asthma in general. Whereas, in a study examined by Leff et al. which explained thatin 110 patients, only 54 patients were given 10mg of montelukast which results in significantly greater protection against exercise-induced bronchoconstriction[21] which shows the study is rational.

In this study, among 110 patients, Beta agonist(LABA)+ corticosteroids(ICS)was prescribed to [64(58.18%)] patient. This combination exerts a bronchodilator effect in patients with asthma. In a study conducted following GINA guidelines, by Ish et al, it was given that thecurrent evidence recommends as-needed low dose inhaled steroid-formoterol combination as the preferred therapy in Step1, with low dose inhaled steroid (ICS) whenever SABA is taken as the alternative (which is as per GINA guideline 2020). For Step 2, either daily low dose ICS or as- needed low dose ICS-formoterol combination can be used as the preferred controller therapy.[22] So, our study seemed to follow GINA guideline 2020, which is rational.

CONCLUSION AND RECOMMENDATION

The study conducted at Norvic International Hospital (NIH) showed that majority of patients were female; as out of 110 patients, 62 were female and only 48 were male. The age group mostly affected was 50-59 years. Most of the patient was diagnosed with mild asthma followed by moderate asthma.

As per this study, Beta2 adrenoceptor agonist(SABA) i.e. Salbutamol [75(68.18%)] was most commonly prescribed drug followed by Corticosteroids [69(62.73%)] for the treatment of asthma in adults which were rational to guidelines. The study showed that Beta2 adrenoceptor agonist (LABA, formoterol) combination with Corticosteroids(Budesonide) was most commonly prescribed drug in combination; In the study conducted by Ish et al by following GINA guidelines showed that combination exerts more bronchodilator effect in patients with asthma.

Either daily low dose ICS or as-needed low dose ICS-formoterol combination can be used as the preferred controller therapy which shows the study follows GINA guidelines. So, the prescribing pattern in our study seemed rational. The widely utilized dosage form was inhalers followed by tablets.

From the above study it was found that common risk factors for the development of disease was exposure to cold air [22(20%)], exposure to dust [15(13.64%)], past history [13(11.82%)], smoking [12(10.92%)] in which exposure to cold airwas most prominent.

Thus, this study focused on analyzing prescription pattern as well as risk factors in adult asthma patient.

The study site can be made multicenter to strengthen the findings of study. The finding would have been more impactful if the time frame was longer.

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