

Frequency of Atopic Dermatitis and Allergic Rhinitis in Known Patients of Bronchial Asthma

Atopic Dermatitis
and Allergic
Rhinitis in
Bronchial
Asthma

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ABSTRACT

Objective: To examine the incidence of the atopic dermatitis and allergic rhinitis in adult known patients of bronchial asthma.

Study Design: cross-sectional study

Place and Duration of Study: This study was conducted at the department of Medicine, CMH hospital, Nowshera, from January 2021 to September 2021.

Materials and Methods: A total of 100 patients suffering from bronchial asthma were included in this study and patient that had history of COPD were excluded from the study. They were interviewed by an independent researcher. The age, gender, smoking status, residence, exposure to animals /livestock and the duration of asthma was noted in a predefined proforma. The frequency of asthma was calculated and the degree of asthma was also classified. SPSS version 24 was used for data analysis and cutoff for significance was $p \leq 0.05$.

Results: Out of total patients, 39 (39.0%) were suffered with atopic dermatitis and 61 (61.0%) and 72 (72.0%) suffered from allergic rhinitis. The average age in atopic dermatitis and non-atopic dermatitis patients was almost equal, ($p=0.882$). Males were most common in atopic dermatitis patients as 33 (84.6%) and females were most common in 61 (100.0%) in non- atopic dermatitis patients, ($p<0.001$). Smoking was the most common 38 (97.4%) in atopic dermatitis patients, ($p<0.001$). All the atopic dermatitis patients lived in urban area, ($p<0.001$). Further, all the atopic dermatitis patients had animal livestock, ($p<0.001$). Atopic dermatitis patients was most common in allergic rhinitis, Asthma class and Allergic rhinitis class, ($p<0.001$).

Conclusion: There is a higher prevalence of atopic dermatitis and allergic rhinitis in patients that are treated as bronchial asthma patients. Further studies are needed to ascertain the risk factors associated with atopic dermatitis, allergic rhinitis and bronchial asthma.

Key Words: Atopic dermatitis, Asthma, Allergic asthma, Bronchial asthma

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INTRODUCTION

Asthma and rhinitis, which affect the lower and upper airways, have historically been considered two separate biological entities. Both illnesses, however, have recently been identified as symptoms of the chronic inflammatory respiratory syndrome of the common airways, or unified airways disease. Atopic dermatitis (AD) is an inflammatory skin condition that can last a lifetime. The increased frequency of AD in juvenile and adult patients with asthma has been well documented.

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Because asthma and rhinitis frequently coexist, every patient with asthma should be evaluated for the presence and severity of allergic rhinitis. Furthermore, proper care of both disorders is required for maximum therapy results. The prevalence of the relationship between asthma allergic rhinitis and atopic dermatitis in adult asthmatic patients attending allergy outpatient clinics is investigated in this study. Asthma and rhinitis, for example, have traditionally been viewed as separate biological entities. But more recently, it has been found that both ailments are symptoms of united airways disease, a persistent respiratory illness with inflammatory symptoms that affects the common airways^(1,2).

Since the entire respiratory system is affected, allergic rhinitis and asthma should be viewed as an illness that affects both diagnosis and treatment. Asthma and allergic rhinitis frequently coexist. This connection has been demonstrated by clinical findings, epidemiological research, immunological discoveries, and therapeutic outcomes^(1,2). The widespread cohabitation of these illnesses led to the development of the WHO recommendations. A thorough overview of the biology,

diagnosis, and treatment of allergic rhinitis was released in 2001 by the World Health Organization (WHO) and the ARIA Initiative (Allergic Rhinitis and Its Impact on Asthma)⁽²⁾. The main goals of this study were to develop evidence-based diagnostic and treatment recommendations and to further medical understanding of allergic rhinitis.

Asthma affects between 4% and 11% of the general population, and allergic rhinitis affects between 10% and 30% of persons. Between 20% and 50% of those with allergic rhinitis also have asthma, which affects 30% to 90% of those with allergic rhinitis⁽³⁻⁵⁾.

The cause of the illness has little bearing on whether rhinitis and asthma develop at the same time. Asthma development as well as the frequency and severity of allergic asthma have also been linked to allergic rhinitis⁽⁶⁾. Whether the degree of allergic rhinitis correlates with the severity of asthma is unknown. Every asthma patient should be assessed for the presence and severity of allergic rhinitis due to the common coexistence of asthma and rhinitis. For the best possible results from therapy, both illnesses must be treated properly.

An inflammatory skin disorder called atopic dermatitis (AD) can last a lifetime. Asthma patients of all ages are more likely to develop AD, which has been extensively documented⁽⁴⁾. Genetic risk factors and environmental triggers are to blame for this.⁽⁵⁾ Filaggrin deficiency may result in a weakened skin barrier that makes certain AD patients more susceptible to allergens. This minority may go on to develop asthma after repeatedly being exposed to the same allergens in the airways. T-helper (Th) 2 cells in both AD and asthma produce IL-4, IL-5, IL-10, and IL-13, which might further raise type 2 immunological reactivity and encourage eosinophil recruitment. This study examines the incidence of the connection between atopic dermatitis and asthma allergic rhinitis in adult asthmatic patients.

MATERIALS AND METHODS

This prospective cross-sectional study was conducted at CMH Nowshera from January 2021 to September 2021. Before the start of the study, ethical approval was sought from the hospital ethical review committee. All the patients with diagnosed bronchial asthma that presented in the OPD during the study period were included in this study, any patient that had history of COPD were excluded from the study. Every participant in this study received an interview where they were asked questions regarding their personal and family histories of atopy, asthma, and rhinitis, as well as their demographics (age, gender, and place of residence) (frequency and intensity of symptoms, exacerbations, disease duration). The Global Initiative for Asthma (GINA)^[13] classification were used for the severity of asthma, performed spirometry in accordance with ERS recommendations, and predicted normal values for

spirometry were based on ERS recommendations for adult patients. Asthma was divided into the following categories: intermittent (symptoms occur less than once a week; brief exacerbations Nocturnal symptoms occurring no more than twice per month, FEV1 or PEF expected to be at 80%, and PEF or FEV1 fluctuation below 20%). Exacerbations may interfere with activity and sleep if they are mild persistent (symptoms more than once a week but less than once a day). Symptoms at night more than twice every month. Variability in PEF or FEV1 between 20 and 30 percent), somewhat persistent (symptoms present every day; exacerbations may interfere with activities or sleep; frequent nocturnal symptoms). Regular use of an inhaled short-acting 2-agonist, severe persistent (regular exacerbations), and FEV1 or PEF variable greater than 30% regularly occurring nighttime asthma symptoms Physical activity restriction (FEV1 or PEF 60% predicted). During the study period 100 patients were included in the study. They were interviewed by an independent researcher. The age, gender, smoking status, residence, exposure to animals /livestock and the duration of asthma was noted in a predefined proforma. The frequency of asthma was calculated and the degree of asthma was also classified.

RESULTS

Total 100 patients agreed to be a part of this study and were interviewed. Out of these, 39 (39.0%) were suffered with atopic dermatitis and 72 (72.0%) suffered from allergic rhinitis. The average age in atopic dermatitis and non-atopic dermatitis patients was almost equal, (p=0.882). Males were most common in atopic dermatitis patients as 33 (84.6%) and females were most common in 61 (100.0%) in non- atopic dermatitis patients, (p<0.001). Smoking was the most common 38 (97.4%) in atopic dermatitis patients, (p<0.001). All the atopic dermatitis patients lived in urban area, (p<0.001). Further, all the atopic dermatitis patients had animal livestock, (p<0.001). (Table. I).

Table No.1: Association of atopic dermatitis with demographic characteristics

Variable	Atopic Dermatitis		p-value
	Yes	No	
Age (years)	46.56±1.94	46.62±1.91	0.882
Gender			
Male	33 (84.6)	0 (0.0)	<0.001
Female	6 (15.4)	61 (100.0)	
Smoking status	38 (97.4)	0 (0.0)	<0.001
Area of residence			
Urban	39 (100.0)	4 (6.6)	<0.001
Rural	0 (0.0)	57 (93.4)	
Animal livestock	39 (100.0)	20 (32.8)	<0.001
Duration of	4.48±0.91	4.48±0.88	0.967

asthma			
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Table No.2: Outcome variable and associated allergy diseases

Variable	Atopic Dermatitis		p-value
	Yes	No	
Allergic rhinitis	39 (100.0)	33 (54.1)	<0.001
Asthma class			
Intermittent	28 (71.8)	0 (0.0)	<0.001
Persistence of mild illness	11 (28.2)	6 (9.8)	
Persistence of moderate illness	0 (0.0)	37 (60.7)	
Persistence of severe illness	0 (0.0)	18 (29.5)	
Allergic rhinitis class			
Mild intermittent	18 (46.2)	0 (0.0)	<0.001
Moderate-severe intermittent	21 (53.8)	5 (8.2)	
Mild persistent	0 (0.0)	40 (65.6)	
Moderate severe persistent	0 (0.0)	16 (26.2)	

Atopic dermatitis patients was most common in allergic rhinitis, Asthma class and Allergic rhinitis class, ($p < 0.001$). (Table 2).

DISCUSSION

In number of previous researches atopic dermatitis and other allergy diseases have studied and a pathogenic overlap of one or more endotypes was observed. As a result, the underlying immunological dysfunction of AD and asthma, along with type 2 immunity and higher IgE serum levels⁽⁶⁾ could explain some of their coexistence. The considerable illness reduction found in asthma and Alzheimer's disease trials after treatment with the IL-4 receptor -antagonist dupilumab indicates the close link between the two disorders,⁽⁷⁾ and warrants additional research into potential monotherapy of these two conditions in selected patients.

The result of this study shows that the prevalence of allergic rhinitis and atopic dermatitis is very high in the patients that are diagnosed cases of bronchial asthma.

In a study conducted by hong et al,⁽⁸⁾ they conducted a study on children and assessed the frequency of allergy disorders in children. They discovered that (p for trend 0.001), 9.3% of children aged 0 to 3 years, 19.7% of children aged 4 to 6 years, 16.7% of children aged 7 to 9 years, and 14.5% of children aged 10 to 13 years experienced obesity. Asthma prevalence was 16.5%, 9.8%, 6.5%, and 5.4%, respectively, in these age groups (p for trend 0.001). In these age groups, allergic rhinitis was prevalent in 28.5%, 38.0%, 38.5%, and 35.9% of cases (p for trend = 0.043).

In another study conducted by Pedersen et al,⁽⁹⁾ in Bangladesh, they studies the pattern of prevalence of

asthma, atopic dermatitis in children as they progressed to adulthood. They found out that the prevalence of atopic dermatitis and allergic rhinitis increases with the age and the results of this study are comparable to the results of our study that show a similar trend of increasing prevalence of (6.0%, (95% CI% 4.5 to 7.4%).

Ravnborg and colleagues⁽¹⁰⁾ conducted a recent meta-analysis using 39.503 articles, 213 studies were included as per inclusion and exclusion criteria. They found that the prevalence of asthma was 25.7% in atopic dermatitis patients. They found that there was a significant association between the atopic dermatitis and bronchial asthma. They concluded that asthma is common in the patients of atopic dermatitis.

In a study conducted by Okui⁽¹¹⁾ in Japan, they examined using age-period-cohort (APC) analysis, trends in the prevalence of asthma, allergic rhinitis, and atopic dermatitis in Japan. From 1999 to 2017, data on disease prevalence in Japan were gathered from patient surveys. In 5-year increments, the data were broken down into age groups ranging from 0–4 years old to 65–69 years old. With a one-year shift, a cohort was formed for each age group of each year, and the cohorts born from 1930–1934 through 2013–2017 were studied. They came to the conclusion that atopic dermatitis and bronchial asthma are strongly correlated.

In another study conducted by Bekic et.al⁽¹²⁾. The purpose of the study was to look into the relationship between comorbidity in general practice and atopic dermatitis. A retrospective study on the proportion of patients with atopic dermatitis in the entire population and their concomitant disorders was carried out at the specialized family medicine practice Osijek between January 1 and July 1, 2016. The E-chart served as the data source. Out of 2056 patients, the results revealed that 195 (10.53%) had atopic dermatitis, 80 (41%) had atopic dermatitis and allergic rhinitis, and 34 (17.4%) had asthma. The findings of this study illustrated the "atopic march's" steps. Most patients with atopic dermatitis experience skin abnormalities that spread to other organ systems.⁽¹³⁻¹⁴⁾

The results of our study clearly show a high prevalence of atopic dermatitis and allergic rhinitis in bronchial asthma patients. There are however some limitations to this study. This study does not take in to account the associated risk factors and their relation to the prevalence of allergic rhinitis and atopic dermatitis. This study does not assess the levels of IgE as an indicator for an allergic process. However, this study emphasizes on a need for further, detailed studies to establish relation of asthma, its associated risk factors with with frequency of atopoic dermatitis and allergic rhinitis.

A study was conducted Gupta et al⁽¹⁵⁾ on British population and reported prevalence of allergy diseases up to 11% in children of age below 10 years and 10% in age of 15 years. Simpson et al⁽¹⁶⁾ conducted a study and reported incidence of allergy diseases and reported highest incidence in population of older age.

Another study by Su et al⁽¹⁷⁾ evaluated incidence of atopic dermatitis in different areas of Finland and reported 15.4% atopic dermatitis in urban areas and 15.9% in industrial areas. Hahn et al⁽¹⁸⁾ also observed an increase in frequency of atopic dermatitis, allergy rhinitis and asthma. In a study by Shokouhi Shoormasti et al⁽¹⁹⁾ reported incidence of atopic 3.9% and allergy rhinitis 28.3% and found that there was no association among other allergy diseases and atopic dermatitis.

CONCLUSION

There is a higher prevalence of atopic dermatitis and allergic rhinitis in patients that are treated as bronchial asthma patients. Further studies are needed to ascertain the risk factors associated with atopic dermatitis, allergic rhinitis and bronchial asthma.

Author's Contribution:

Concept & Design of Study:	Asif Afzal
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Conflict of Interest: The study has no conflict of interest to declare by any author.

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