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Mites Are the Most Prevalent Allergen among Children with Severe Asthma in Gorgan, Iran

Original Article

Mohsen Ebrahimi
(MD) Children's Research Center, Golestan University of Medical Sciences, Gorgan, Iran

Shahriar Shenava Raouf
(MD) Student Research Committee, School of Medicine, Golestan University of Medical Sciences, Gorgan, Iran

Email: M1355ebrahimi@gmail.com

Tel: +98911376 5214

Corresponding author: Mohsen Ebrahimi

Address: Children's Research Center, Department of Pediatrics, Taleghani Medical Education Center, Golestan University of Medical Sciences, Gorgan, Iran

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ABSTRACT

Background and Objectives: Asthma is one of the most common respiratory diseases. Inhaled particles that may trigger allergic reactions and air routes are important factors contributing to asthma. This study aimed to determine the abundance of allergens in children with asthma in Gorgan, Iran.

Methods: In this retrospective study, we randomly collected records of all asthmatic patients over five years of age referred to asthma and allergy clinic in Gorgan, Iran. Furthermore, data related to skin prick test were recorded.

Results: The severity of asthma differed significantly between males and females. There was a direct relationship between age and reaction to one allergen. In addition, 18 of 25 (72 %) patients with severe asthma were allergic to more than two allergens. Moreover, the most common allergen was mite (56%).

Conclusion: Mites are the most common allergen among children with asthma in the study area.

Keywords: Asthma , Mites, Allergen

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INTRODUCTION

Allergic diseases are associated with increased immunity against antigens, which are not considered harmful (1). Asthma is an allergic and inflammatory disease of airways characterized by irreversible airflow obstruction and bronchial spasms (2). The common symptoms of asthma include cough and dyspnea. It is one of the most common chronic respiratory diseases with an increased incidence in the recent decade (3). According to the World Health Organization (WHO), about 1.5 million people are suffering from asthma around the world. Smoking, air pollution, home dust, psychological factors, and lack of access to healthcare facilities are risk factors of asthma (4). Allergens or inhalation substances that may incite allergic reactions in the airway are the most important risk factor for asthma. The allergens are divided into two major and minor groups based on the prevalence of people affected (5). Fouladseresht et al. reported sunflower leaf extract, marigold , dandelion, evergreen and beetle as the most common allergens in Kerman, Iran (6). Studies have shown that patterns of allergen could vary widely depending on the geographical location (7). The prevalence of allergens in each area is affected by various factors, including climate, ethnicity, culture and lifestyle (8). Exposure to different types of allergens including dust, pollen and pets (9) and patients' clinical history are factors when treating allergic diseases (10).

The only way to face asthma is to prevent exposure to allergens (6). Therefore, determining the incidence of allergens in different regions is necessary and can help in better decision-making for reducing exposure to these allergens (11). This study aimed to determine the frequency of common allergens in asthma patients referred to the asthma clinic of Gorgan, Iran.

MATERIALS AND METHODS

In this retrospective study, all patients with respiratory asthma over five years of age referred to the Gorgan Deziani Asthma and Allergy Clinic in 2018 were evaluated for sensitivity to various allergens. Overall, 100 people were enrolled via the census sampling method. The patients were examined for respiratory asthma by a specialist. Patients with a history of taking antihistamines and those with severe asthma who could not undergo percutaneous skin testing were excluded from the study.

The ethics committee of Golestan University of Medical Sciences approved the study (ethical code: IR.GOUMS.rec.1398.277). The patients were ensured about the confidentiality of their personal information. After obtaining written informed consent, the patients completed a demographic information questionnaire. The severity of respiratory allergy for each patient was extracted from medical records.

The prick test is a standard and accurate method for measuring type 1 allergies, by which the presence of specific IgE against various allergens is assessed in vivo. Common inhaled allergens evaluated in this study included tree extract (tree mixture), grass extract (weed and grass mixture), candidiasis, *Aspergillus*, *Alternaria*, mite, cockroach, cat hair and dog hair (12, 13). Reaction of the allergen on skin was examined by measuring bulge diameter. A difference of 10 mm in the protrusion diameter compared to the negative control indicated a positive reaction to the allergen (14).

Data were analyzed in SPSS 16.0 software using descriptive statistics, Cross-tab test, and Pearson correlation. All tests were performed at 95% confidence level and significance of 0.05.

RESULTS

The mean age of children with asthma was 10±2 years. Table 1 shows the demographic information and characteristics of patients with respiratory asthma.

Severity of asthma differed significantly between males and females. Moreover, 33% of urban residents and 10% of rural residents had mild asthma ($p<0.05$).

As shown in table 2, the most common allergen was mite (56%), while allergy to more than one allergen was also observed. Of 100 patients, 40 were sensitive to only one allergen, 38 to two allergens, 16 to three allergens, five to four allergens, and one to five allergens.

The allergens were divided into four groups of plants (tree, weed and grass allergens), fungi (*Alternaria*, *Aspergillus*, and *Candida*), insects (mites and beetles), and pets (dogs and cats). The mean age of people who reacted to more

than two allergens was significantly higher than that of those who reacted to one or two allergens (Table 3).

The males to females and urban to rural residents ratios differed significantly between the two groups ($p < 0.05$). All mild asthma cases reacted to one or two allergens, while 18 of 25 (72%) patients with severe asthma reacted to more than two allergens ($p < 0.05$).

Table 1- Demographic information of patients with asthma

Asthma severity	Gender		Total	Habitat		Total
	Male (%)	Female (%)		Urban	Rural	
Mild	12 (23.1%)	11 (22%)	33	18 (33%)	5 (10%)	23
Moderate	28 (53%)	24 (50%)	52	24 (44%)	28 (60%)	52
Severe	12 (23.1%)	13 (28%)	25	12 (22%)	13 (28%)	25
Total	52	48	100	54	46	100

Table 2-Frequency of susceptibility to different allergens in four clusters

Clusters of Allergens	Allergens	Frequency (%)	Total[¥]
Plants	Tree	15 (15%)	74
	Weed	19 (19%)	
	Grass	40 (40%)	
Fungi	*Alternaria*	5 (5%)	29
	Aspergillus	19 (19%)	
	Candida	5 (5%)	
Arthropods	Mites	56 (56%)	70
	Cockroach	14 (14%)	
Pets	Cat	9 (9%)	16
	Dog	7 (7%)	

[¥] Some patients may have allergies to more than one allergen.

Table 3- Reaction to allergens based on gender and place of residence

Reaction to allergens	Male/Female ratio	Urban/Rural ratio	Age (Mean±SD)
One or two allergens	40/38	44/34	9±2
> two allergens	12/10	10/12	12±2
p-value	0.0001	0.0001	0.001

DISCUSSION

Various studies have highlighted the importance of allergies in communities (15). Asthma is an allergic and inflammatory disease of the airways caused by an overreaction of the immune system to specific allergens (16). The incidence of allergic diseases such as asthma, atopic eczema, dermatitis and allergic rhinitis have increased in many countries (17–19). The prevalence of allergic diseases is estimated to be approximately 30% worldwide (20) and 15% in Iran (21).

The present study was performed on 100 children aged 5 to 15 years with asthma. According to the results, severe asthma was significantly more common in females than in males. In addition, mild asthma was more common among residents of urban areas compared to rural residents. Allergic reaction to mite was the most common form found in our study. Consistent with this finding, in a study in Sistan and Baluchestan, almost 90% of subjects had allergy to mites (22). A study in Turkey reported that mite species have a more significant impact on the severity of asthma than other inhaled allergens (23). In the arid regions of Iran, sensitivity to saline grass was more prevalent than other allergens (11).

In a study in the north of Iran, most allergies were related to indoor allergens such as

cockroaches (24).

In our study, grass, *Aspergillus*, and weed were identified as the most allergenic allergens. Because peer allergens cause similar behavioral allergies, allergens were classified into four families, with insects, plants, fungi, and pets being the most prevalent, respectively. In addition, 40 people reacted to only one allergen, 38 to two allergens, 16 to three allergens, five to four allergens, and one to five allergens. In a recent study, the mean age of people who reacted to more than two allergens was significantly higher than the mean age of people who reacted to one or two allergens, which could be due to increased exposure to multiple allergens with increasing age.

CONCLUSION

Based on the results, the highest percentage of allergenicity was related to plants and insects, especially mites. Our results suggest that people with severe asthma react to a greater number of allergens.

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Not applicable.

CONFLICT OF INTEREST

The authors declare that there is no conflict of interest.

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