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Prevalence of Common Aeroallergens in Patients with Allergic Rhinitis in Gorgan, North of Iran, Based on Skin Prick Test Reactivity

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Abstract

Background

Allergic rhinitis is one of the most common types of rhinitis. *Allergen avoidance* is the most important way of preventing this disease. The present study is carried out to determine the frequency of common aeroallergens in patients with allergic rhinitis in Gorgan city by skin prick test (SPT) reactivity.

Materials and Methods

In this cross-sectional study 270 patients referring to the Asthma and Allergic Center in Gorgan city, Iran, were enrolled. Diagnosis of allergic rhinitis was confirmed by specialist asthma and allergy. A questionnaire containing demographic data and patient's history was completed. Skin prick test containing standard allergen extracts, histamine, and physiologic serum was performed on patients. The data were analyzed using SPSS software version16.0.

Results: In the present study, 270 patients (113 males and 157 females) had perennial allergic rhinitis (PAR), seasonal allergic rhinitis (SAR), and mixed allergic rhinitis (MAR) (n=166, 54, 47, receptivity). Out of these patients, the most common aeroallergens was a house dust mite called Dermatophagoides pteronyssinus (43.7%), other common allergen were: weeds (40.7%), Dermatophagoides farinae (40.4%), grasses (32.5%), beetles (30%), trees (22.5%), and molds (16.3%). There was a significant relationship between prevalence of allergy to grasses and gender (P=0.016), weeds and age (P<0.05).

Conclusion

According to the results, the most prevalent aeroallergen was house dust mite. Weeds and beetles were also common among patients, respectively. Because of the high prevalence of allergy to mites in this region, we suggest finding some useful preventive strategies to reduce sensitivity to mite allergens.

Key Words: Aeroallergen, Allergic Rhinitis, Iran, Skin Prick Test.

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1- INTRODUCTION

Allergic rhinitis is the most common allergic disorder which impacts on quality of life of patients. Because of increasing industrialization and air pollution, the prevalence of allergic rhinitis has increased throughout the world in recent years (1- 5). Nowadays up to 40% of world population is affected by allergic rhinitis (6). Prevalence of allergic rhinitis shows geographical variations among different parts of Iran (4). Rhinitis refers to the existence of one of the following symptoms in the patient including sneezing, rhinorrhea, congestion, and itching (3, 4). Allergic rhinitis is divided into 3 categories including seasonal allergic rhinitis (SAR), perennial allergic rhinitis (PAR), and mixed allergic rhinitis (MAR) (7).

Studies have demonstrated that different factors are involved in the development of allergic rhinitis such as environmental factors, genetic factors, and age of exposure to different allergens (1). Among these factors, aeroallergens play a critical role in the pathogenesis of allergic rhinitis (2). The common allergens that because allergic rhinitis include trees, grasses, weed pollens, molds, house dust mite, beetles, animal fur and skin, rodents and fungi (2, 4). Skin prick test (SPT) is the best diagnostic test for assessment of allergens among patients with allergic rhinitis (8). Allergen selection for SPT is performed based on patient's clinical history, signs and symptoms, environmental and occupational exposures and demographic data (1).

Avoiding exposure to allergen is the best way to prevent the disease. Because of increasing prevalence of allergic rhinitis it seems that recognition of allergens leads to better prevention and treatment of this disease. Thus, the aim of this study was to determine the prevalence of common aeroallergens in patients with allergic rhinitis in Gorgan city, Iran, based on Skin Prick Test reactivity.

2- MATERIALS AND METHODS

2-1. Study design and population

This cross-sectional study carried out during year 2016 and 2017 in spring and summer between April and September involving patients referring to the specialist clinics of asthma and allergy in Taleghani hospital and specialist clinic in Gorgan, North of Iran. According to the previous studies, the required sample size in the original study was calculated to be 270 patients using NCSS software (3, 9). NCSS software provides a complete, easy-to-use collection of hundreds of statistical and graphics tools to analyze and visualize your data.

2-2. Methods

In this method, a drop of standard allergen (Greer) is placed on the forearm, and with a lance it is a slight scratch on the skin. After 10 minutes, the reaction was red and swollen, measured with the ruler, and the diameter of the swelling and redness area was measured and compared with control. Histamine is used as a positive control and the physiologic serum is used as a negative control.

2-3. Measuring tools

We documented subject data including age, gender, history of asthma and conjunctivitis. In addition to obtaining written informed consent from all patients or their parents, we considered referral, prevention and treatment for the patients with positive reaction.

2-4. Intervention

Among allergic patients, the patients who had allergic rhinitis enrolled based on physician diagnosis and inclusion criteria. Participants first were assured that their data would not be linked to their identity and that the responses would only be used

for study purposes. The patients who were competent to give informed constant did not use systemic corticosteroids or antihistamine during the past week and didn't have dermatographism.

2-5. Ethical consideration

The study protocol and consent form were approved by Ethics Medical Committee. The code of ethic study is (IR.GOUMS.REC.1395.118). In this study, there was no therapeutic intervention in patients, but only one diagnostic test (that performed routinely by all allergists) was carried out.

2-6. Inclusion and exclusion criteria

The criteria for entry into this study (completion of consent form, non-use of systemic corticosteroid medications and antihistamines from a week ago, and lack of dermatographia) were those with allergic rhinitis.

2-7. Data Analyses

Skin prick test and its interpretation were performed by asthma and allergy specialist. The data were analyzed by SPSS software (version 16.0). Chi-square test was used to examine and compare the relationship between the results of prick test and negative control. P- value less than 0.05 were considered as significant.

2-8. Laboratory measurements

Allergens were manufactured by the American Greer Company. These allergens are stored in standard and special glass containers, which are dropped out to make the test by squeezing the dropper each time. SPT was performed based on the patient's history of exposure to allergens. The SPT consisted of histamine and physiologic serum as positive and negative controls and aeroallergens including mites (Dermatophagoides pteronyssinus, Dermatophagoides farinae, and Blomia tropicalis), tree, grass, weed, fungi (Penicillin and Alternaria), fur and skin of animals and insects (dog, cat, feather, and beetle). A drop of allergens and control solutions is placed on the forearm. Also, a small scratch is made on forearm skin. After 10 minutes, a ruler is used to measure the reaction which consists of erythema and edema and the measured diameter is compared with control. A wheal diameter > 3 mm is considered as a positive result which indicates allergy (2).

3- RESULTS

In this cross-sectional study, 270 patients referring to the Asthma and Allergic Center in Gorgan city (Iran) were enrolled. Prevalence of some aeroallergens was evaluated by SPT reactivity in these patients. Among all subjects, 113 (41.85%) were males and 157 (58.14%) were females. Out of 270 patients, 166 (61.48%) had PAR, 54 (20%) SAR, and 47 (17.40%) MAR, respectively. Also, 34 (12.59%) patients had asthma, 66 (24.44%) conjunctivitis, and 10 (3.7%) eczemas (**Table.1**).

Our result showed the association between allergy to a specific antigen and gender. Statistical analysis demonstrated that there was a significant relationship only between allergy to grasses and gender (P=0.016). Our study found no significant association for other allergens (P>0.05). **(Table.2)**; our finding evaluated the association between allergy to a specific antigen and patient age. Statistical analysis demonstrated that there was a significant relationship only between allergy to weeds and patient age (P<0.05). Our study found no significant association for other allergens (P>0.05) **(Table.2)** *(Please see the table in the end of paper).*

Our result evaluated the association between allergy to a specific antigen and history of asthma. Statistical analysis demonstrated that there was a significant

relationship between allergy to different kinds of mites and beetles and history of asthma (P<0.05). Our study found no significant association for other allergens (P>0.05). We evaluated the association between allergy to a specific antigen and conjunctivitis. Statistical analysis found that there was a significant relationship between allergy to grasses and weeds and conjunctivitis (P<0.05). Our study found no significant association for other allergens (P>0.05) **(Table.2)**. We evaluated the association between allergy to a specific antigen and eczema. Statistical analysis found that there was a significant relationship between allergy to different kinds of mites and beetles and having eczema (P<0.05). Our study found no significant association for other allergens (P>0.05) (**Table.2**).

Table-1: Demographic data, types pf AR and concomitant disorders of patients

Topics	Number (%)	Concomitant Disorder		
		Conjunctivitis Number (%)	Asthma Number (%)	Eczema Number (%)
All patients	270	66(24.44%)	34(12.59%)	10(3.70%)
Male Female	113(41.8%) 157(58.1%)			
PAR	166(61.48%)	40(14.81%)	27(10%)	10(3.70%)
SAR	54(20%)	20(7.40%)	2(0.7%)	0(0%)
MAR	47(17.40%)	6(2.2%)	4(1.48%)	0(0%)

PAR: Perennial Allergic Rhinitis; SAR: Seasonal Allergic Rhinitis; MAR: Mixed Allergic Rhinitis.

4- DISCUSSION

The results of our study showed that the most patients were sensitized to mite allergens. Among them, more than 40% were sensitized to mite allergens and almost 40% were sensitized to weeds. The remaining subjects were sensitized to grass (30%), and beetle (30%), dog and cat, respectively. The result of this study enrolled 270 patients with allergic rhinitis whose disease was evaluated by asthma and allergy specialist. Gender, age, type of allergic rhinitis and history of asthma, eczema, and conjunctivitis were evaluated; among patients, 61.48% had PAR, 20% had SAR and 17.40% had MAR. The underlying disease associated with allergic rhinitis was conjunctivitis (24%), asthma (12%) and eczema (3%). Patients with MAR also had the similar sensitivity pattern. Similar to our results, a study conducted in 743 patients with asthma and allergic rhinitis in Bushehr reported that mites were the most prevalent allergens among patients in that region (2). In contrast, a study carried out in 400 patients with asthma in Tehran, reported that the most common allergen was pollen (3). Another study conducted in 1006 patients with allergy in Mashhad, demonstrated that weed pollens were the most common allergens among patients with asthma and allergic rhinitis (11). It seems that variations in geographical characteristics affect the prevalence of allergens among

different regions. Almost 50% of patients with PAR were sensitive to DP and DF. In addition, the prevalence of sensitivity to DP and DF was higher among patients with PAR than two other patient groups. Also, patients with PAR had a significantly lower sensitivity to grasses, weeds, and trees. In contrast, the most common allergens among patients with SAR were weeds and grasses, respectively. Almost 60% of these patients were sensitized to these two allergens.

The prevalence of sensitivity to weeds and grasses was higher among these patients than other patient's groups. Also, these patients were sensitive to DP (22%), and DF (26%). It is notable that there was a statistically significant difference between the prevalence of sensitivity to DP and DF among patients with SAR and patients from the two other groups. Our study demonstrated that there was a significant relationship between prevalence of allergy to grasses and gender. Sensitivity to grasses was more prevalent among men. A study carried out by Wang et al., found different sensitivity patterns among males and females. Males showed sensitization to allergens in younger ages than females in this study (6, 10).

A study carried out in Northeastern Iran reported that there was no statistically significant relationship between prevalence of sensitivity to allergens and gender (11). This may be assigned to variations in genetic factors. Our study found that prevalence of allergy to weeds was increased in older ages. Similar to our results, a study conducted in 4,085 patients with allergic rhinitis demonstrated that allergy to weeds showed an increasing prevalence of aging (6). In contrast, a study carried out by Mahboubi et al., reported that prevalence of sensitization to pigweed was higher in older patients (11). This difference may be due to variations in age and race of patients. Our results showed that prevalence of allergy to different kinds of mites was significantly higher among patients with a history of conjunctivitis, asthma or eczema. In accordance with our results, a study carried out by Farrokhi et al., found that mites were the most common allergens among patients with a history of eczema (12). Also, another study carried out by Mohammadzadeh et al. found that sensitivity to mites was more prevalent among children who had a history of asthma, eczema and urticarial (13). Because of the high prevalence of mites, it seems that evaluation of sensitization to different kinds of mites might be useful in patients with allergic rhinitis. (13)

5- CONCLUSIONS

In conclusion, our study found that more than 50% of patients with PAR had the most sensitivity to different kind of mites, weeds, and beetles, respectively. Also, the patients with SAR had the most allergies to weeds and grasses, respectively. The sensitivity to mites was much less than weeds and beetles among these patients. Because of the high prevalence of allergy to mites in this region, our study suggests finding some useful methods to reduce sensitivity to mite allergens such as reduction of home humidity and washing the sheets weekly.

6- CONFLICT OF INTEREST: None.

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8- REFERENCES

1. Hosseini S, Shoormasti RS, Akramian R, Movahedi M, Gharagozlou M, Foroughi N, et al. Skin prick test reactivity to common aero and food allergens among children with

allergy. Iran J Med Sci. Shiraz University Medical School; 2014;39(1):29.

2. Farrokhi S, Gheybi MK, Movahed A, Tahmasebi R, Iranpour D, Fatemi A, et al. Common aeroallergens in patients with asthma and allergic rhinitis living in southwestern part of iran: based on skin prick test reactivity. Iran J Allergy, Asthma Immunol. Tehran University of Medical Sciences; 2015;14(2):133.

3. Pazoki N, Ahmadi A, Mansori M, Mosavi Khorshidi SM, Onsori F, Salimian J. Prevalence of Aeroallergens in Patients with Allergic Rhinitis. J Maz Univ Med Sci. 2015;25(125): 73-80.

4. Farahmand Fard MA, Khanjani N, Arabi Mianroodi A, Ashrafi Asgarabad A. Asthma and Allergic Rhinitis Correlation in Palm Tree Workers of Jahrom City in 2016. Iranian journal of otorhinolaryngology. 2017;29(92):147-54.

5. Onsori F, Ahmadi A, Mansori M, Mosavi Khorshidi SM, Pazoki N, Salimian J. Prevalence of food allergens in patients with atopic dermatitis referring to the asthma and allergy clinic in Tehran in 2014.Scientific Journal of Kurdistan University of Medical Sciences 2016;21(1):40-6.

6. Wang W, Huang X, Chen Z, Zheng R, Chen Y, Zhang G, et al. Prevalence and trends of sensitisation to aeroallergens in patients with allergic rhinitis in Guangzhou, China: a 10-year retrospective study. BMJ Open. 2016;6(5):e011085.

7. Brozek JL, Bousquet J, Baena-Cagnani CE, Bonini S, Canonica GW, Casale TB, et al. Allergic Rhinitis and its Impact on Asthma(ARIA) guidelines: 2010 revision. J Allergy Clin Immunol. 2010; 126(3):466-76.

8. Calderon MA, Gerth van Wijk R, Eichler I, Matricardi PM, Varga EM, Kopp M V, et al. rspectives on allergen-specific immunotherapy in childhood: An EAACI position statement. Pediatr Allergy Immunol. Wiley Online Library; 2012;23(4):300–6.

9. Gökçe Mİ, Hajıyev P, Süer E, Kibar Y, Sılay MS, Gürocak S, et al. Does structured withdrawal of desmopressin improve relapse rates in patients with monosymptomatic enuresis? J Urol. 2014; 192(2):530-4.

10. Nasiri R, Homagostar G, Tajik M, Shekari A, Roshani D, Ataei P, et al. Evaluation of Prevalence of Allergic Rhinitis Symptoms in Kurdistan, a Western Province in Iran. International Journal of Pediatrics 2015; 3(6.1):1039-46.

11. Mahboubi Oskouei Y, Farid Hosseini R, Ahanchian H, Jarahi L, Ariaee N, Jabbari Azad F. Report of Common Aeroallergens among Allergic Patients in Northeastern Iran. Iranian journal of otorhinolaryngology. 2017;29(91):89-94

12. Farrokhi, S.Gheybi, MK.Movahed, A.Iranpour, D.Ostovar, A.4Vahdat, K.Khazaei H. Evaluation of the Frequency of Food and Aeroallergens in Patients with Eczema and Urticaria in Province of Bushehr: Based on Skin Prick Test Reactivity. Iran South Med J. 2014;17(4):62937.

13. Mohammadzadeh, E, Ranjbar B, Alizadeh Navaei R, Aziznejad P. Mite Sensitivity in Children with Allergy. JBUMS. 2012; 14 (4):78-82.

Table-2: The prevalence of sensitivity to aeroallergens among different patient groups

Topics		Allergens										Chi-square test
		DP Number (%)	DF Number (%)	Trees Number (%)	Grasses Number (%)	Weeds Number (%)	Beetles Number (%)	Cats Number (%)	Dogs Number (%)	Molds Number (%)	Feathers Number (%)	P- value
All patients		118(43.7)	109(40.4)	61(22.5)	88(32.5)	110(40.7)	81(30)	14(5.2)	15(5.6)	44(16.3)	21(7.8)	
Gender	Male	47(41.6)	41(36.3)	27(23.8)	46(40.7)	52(46)	37(32.7)	3(2.7)	5(4.4)	20(17.7)	9(8)	0.416
	Female	71(45.2)	68(43.3)	34(21.6)	42(26.7)	58(36.9)	44(28)	11(7)	10(6.4	24(15.3)	12(7.6)	
Age (year)	≤18	28(52.8)	28(52.8)	11(20.7)	20(37.7)	9(16.9)	14(26.4)	4(7.5)	3(5.7)	11(20.8)	4(7.5)	0.077
	18-30	50(46.7)	42(39.3)	22(20.5)	34(31.7)	43(40.1)	36(33.6)	3(2.8)	4(3.7)	18(16.8)	4(3.7)	
	>30	40(36.4)	39(35.5)	28(25.4)	34(31)	58(52.7)	31(28.2)	7(6.4)	8(7.3)	15(13.6)	13(11.8)	
Type of Aeroallergens Rhinitis	PAR	84(50.6)	80(48.2)	30(18)	36(21.6)	55(33.1)	50(30.1)	6(3.6)	9(5.4)	32(19.3)	9(5.4)	0.000
	SAR	12(22.2)	14(25.9)	17(31.4)	34(62.9)	35(64.8)	13(24.1)	3(5.6)	3(5.6)	6(11.1)	9(5.4)	
	MAR	22(46.8)	15(31.9)	12(25.5)	17(36.1)	17(36.1)	16(34)	5(10.6)	3(6.4)	5(10.6)	6(12.8)	
History	Conjunctivitis	28(42.4)	27(40.9)	19(28.7)	31(47)	36(54.5)	20(30.3)	3(2.9)	4(6.1)	11(16.7)	3(4.5)	Not valid with Chi-square test
	Asthma	26(76.5)	24(70.6)	6(17.6)	10(29.4)	10(29.4)	16(47.1)	1(2.9)	0(0)	5(14.7)	2(5.9)	
	Eczema	8(80)	9(90)	3(30)	2(20)	4(40)	7(70)	98(10)	0(0)	2(20)	0(0)	

DP: Dermatophagoides Pteronyssinus; DF: Dermatophagoides farina; PAR: Perennial allergic rhinitis; SAR: Seasonal allergic rhinitis; MAR: Mixed allergic rhinitis.