Prevalence of Aeroallergens in Allergic Rhinitis in Shiraz

Sara Kashef[1,2], Mohammad Amin Kashef[2], and Fardin Eghtedari[2]

[1]Division of Immunology and allergy, [2]Allergy Research Center, Shiraz University of Medical Sciences, Iran

ABSTRACT

Allergic rhinitis is an extremely common disease worldwide. Aeroallergens are very often involved in allergic rhinitis and their prevalence may vary in different regions. The causative allergens of allergic rhinitis in our area are unknown.

The purpose of this study was to determine the prevalence of skin reactivity to different aeroallergens in patients with allergic rhinitis in the city of Shiraz, Iran.

A total of 212 patients who were referred to Motahari Allergy Clinic with chronic rhinitis were subjected to skin prick test (SPT) with a series of common allergenic extracts including grasses, weeds, trees, house dust mites and moulds.

One hundred and thirty two subjects (62.2%) had positive SPT to at least one aeroallergen. Male to female ratio was 1.2 and mean age was 18.2 years. The prevalence rates for allergen groups were: pollens (92.4%), mites (22.7%) and moulds (8.3%). Among 122 patients reactive to pollens, 92 (75.4%) showed skin reactivity to weeds, 78 (63.9%) to grasses and 68 (55.7%) to trees. Polysensitization was common, with 75.7% of all sensitized patients being positive to more than one aeroallergen.

Pollens are the main sensitizing allergens among patients with allergic rhinitis in Shiraz. This pattern of prevalence was expected based on herbal geography, climate and also found to be compatible with the results from studies carried out in places with the same habitat.

Key words: Aeroallergens, Allergic Rhinitis, Skin Test.

INTRODUCTION

Allergic rhinitis is clinically defined as a symptomatic disorder of the nose induced by an IgE-mediated inflammation after allergen exposure of the membranes lining the nose. Symptoms of rhinitis include rhinorrhea, nasal obstruction, nasal itching and sneezing, are reversible spontaneously or under treatment.[1]

Allergic rhinitis represents a global health problem. It is an extremely common disease affecting 10 to 25% of the population.[2] An increasing prevalence of allergic rhinitis over the last decades has been recognized.[3] Although it is not usually a severe disease it significantly alters the social life of patients.

The prevalence of allergic rhinitis may vary both within and between countries. This variation has been attributed to the overall aeroallergen burden.[4] In the surveys carried out in other parts of the world prevalence of different aeroallergens has been defined. We decided to carry out a study to detect the prevalence of skin reactivity to different aeroallergens in patients with allergic rhinitis in our area in order to reach the better management strategies.

Corresponding Author: Dr. Sara Kashef, Department of Immunology and Allergy, Shiraz University of Madical Sciences, Shiraz, Iran. Tel: (+98 711) 6265024, Fax: (+98 711) 6261000, E-mail: eghtedaf@sums.ac.ir

MATERIALS AND METHODS

This cross- sectional study, encompassed a total of 212 patients [male: female ratio of 1.1 and mean age of 17.8 (range 1 to 61 years)] who were referred to Motahari Allergy Clinic, between May 2001 till May 2002 with symptoms of chronic nasal problems such as rhinitis, obstruction and classic hay fever.

All patients underwent skin prick test (SPT) with at least 10 common allergenic extracts (Allergopharma). These allergens were chosen because they had a relative high frequency in Shiraz[5,6] including extracts of pollens such as trees (Acacia, Ash, Birch, Hazel, Elder, Oak, Elm, Pine, Plane tree and Mixed trees), grasses (Timothy, Mixed grasses, Bermuda grass, Blue grass and Rye grass) and weeds [Pigweed, Meadow fescuo, Mixed weed, Lamb's quarters (Chenopodium album) and Hornbeam], mites as : D. pteronyssinus and D. farinae, and moulds as : Mixed fungi, Alternaria, Aspergillus and Candida.

SPTs were conducted by an expert nurse under the supervision of an allergologist. The allergenic extract was placed on to the volar surface of forearm and introduced into the epidermis by a disposable hypodermic needle. The needle tip was then gently lifted upward to elevate a small portion of epidermis and then withdrawn. Then the solution was wiped away with a tissue paper.[7] For each patient both diameters of skin reaction were recorded and results were compared with positive control (Histamine).[8]

The diagnosis of allergic rhinitis was established by a combination of clinical history, physical examination and positive SPT reaction (diameter >3mm or compared with control) to at least one of the aeroallergens.[1]

A study questionnaire requesting demographic data, family history of atopy and respiratory symptoms was also handed over to each patient.

All data were analyzed on statistical program (SPSS, version 10), by chisquare method.

RESULTS

Among 212 patients with chronic nasal problems, 132(62.2%) had positive SPT to at least one of the aeroallergens and marked as allergic rhinitis with male to female ratio of 1.2 and mean age of 18.2 years. 47% of patients with positive tests were in age group 6-15 year and 47.7% were older than 15 years. Only 5.3% were found to be younger than 5 years.

Frequency of positive family history of atopy in patients with allergic rhinitis and non -allergic rhinitis was 60% and 38.2% (p-value= 0.002), showing a significant difference.

The prevalence rates for allergen groups were: pollens (92.4%), mites (22.7%) and moulds (8.3%). Pollens, as an out door allergens, were the most common aeroallergens inducing allergic rhinitis in Shiraz

Table 1. Frequency of positive skin prick test to the individual allregens among patients with allergic rhinitis in Shiraz.

Allergen	Number of subjects with positive test	% Frequency of all positive cases
Mites:		
D. pteronyssinus	21	15.5
D. farinae	17	12.8
Pollens:		
Weeds	92	69.6
Grasses	78	59
Trees	68	51.5
Moulds:		
Mixed Fungi	13	9.8
Alternaria	5	3.7
Aspergillus	3	2.2
Candida	1	0.7

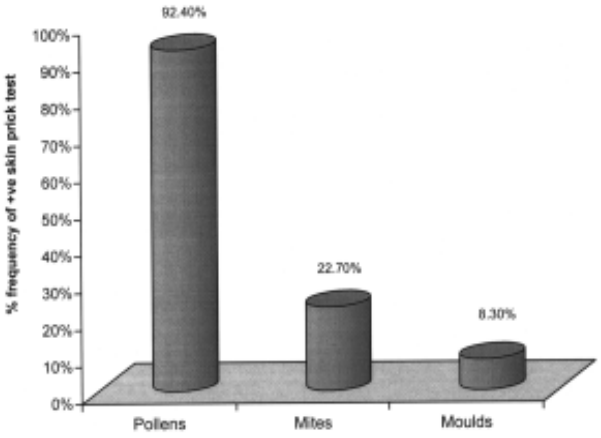

Figure 1. Frequency of positive skin prick test to aeroallergens among patients with allergic rhinitis. (n= 132).

(Figure1).

Frequency of positive tests to individual allergens is depicted Table 1. Among pollens, the highest positive rate belonged to weeds (75.4% of pollens). Pigweed was positive in 62.1% of all allergic rhinitis patients. The second common pollen was grass (63.9% of pollens), among which Timothy and extract of mixed grasses were responsible for higher positive tests. The third pollen was tree (55.7% of pollens).

Polysensitization was common, with 75.7% of all sensitized patients being positive to more than one allergen.

There was no significant difference in prevalence of allergic rhinitis between both sexes. This was also true considering sensitization to each allergen group, therefore in our study the influence of sex was weak

Table 2. Age distribution of patients sensitized to Pollens, Mites and Moulds.

Age (years)	Pollens	Mites	Moulds
1-5	5.7%	6.6%	%0
6-15	49%	53.4%	55%
>15	45.3%	40%	45%
Total	100%	100%	100%

(p= 0.49).

In all the three allergen groups, male to female ratio of sensitized patients was greater than one.

Prevalence of allergic rhinitis was lower in patients younger than 5 year compared to 6-15 years and older than 15 years (p= 0.009), but the difference between the latter two age groups was not statistically meaningful (p>0.05), therefore in our study the prevalence of allergic rhinitis increases after early childhood.

In all the three age groups pollens were the most common aeroallergens followed by mites and moulds.

Difference in frequency of sensitization to pollens, mites and moulds in different age groups was not significant (p>0.05) Table II.

DISCUSSION

This study has shown that pollens constitute the major sensitizing aeroallergen in patients with allergic rhinitis in Shiraz, with as much as 92.4% of all positive cases sensitized to at least one pollen. The rate of sensitization to mites and moulds was 22.7% and 8.3% respectively. Among pollens, weeds had the highest rate of sensitization.

Based on our knowledge about dry climate and regional herbal geography of Shiraz, and other surveys conducted on aeroallergens in our area[5, 6] these results were expected. In one study conducted in Tehran,[9] prevalence pattern of different types of pollens (weeds, grasses, trees) was the same as in our study.

In Ankara, grass pollens were found to be the major allergens, by skin test reactivity comparing to Seoul which weeds and trees were found as the major outdoor allergen. Allergic reactions to indoor allergens were significantly higher in Seoul than in Ankara.[10] Herbal geography, climate and temperature is responsible for the variations.

In Kuwait (a desert environment), higher sensitization rates among pollens belong to plants that were imported for shade or for binding sand (Chenopedium and Bermuda grass).[11] According to the All India Coordinated Project on Aeroallergens and Human Health, major allergens vary from place to place in India. Major causative agents implicated are pollen grains, fungal spores, dust mites, insect debris, animal epithelia,etc.[4]

In most European and North American countries, the allergens with the highest sensitization rates among patients with nasal symptoms, whether by SPT or RAST, are pollens followed by house dust mites and cat danders. Ragweed pollen is a major provocative factor for rhinitis in North America.[12]

In contrast, house dust mites were reported to have the highest rate of sensitization among patients with allergic rhinitis in Thailand,[13] Singapor[14] and Mexico City.[15] This difference also was expected since mites tend to require high humidity and moderate temperature to thrive, whereas Shiraz has a dry climate and the temperature in summer is high.

A family history of allergy, especially allergic rhinitis, is an established risk factor for allergic rhinitis in most studies[16] and we also came to the same conclusion.

We failed to find a statistically significant correlation between patient reactivity and patients' gender. In this regard some studies agree with us[9] and others against us.[10,17,18]

In conclusion pollens are the major aeroallergens provocating allergic rhinitis in Shiraz. This was expected based on herbal geography and climate.

Our results are compatible with similar studies carried out in other parts of the country and other countries with the same environment. Further investigations regarding the possible local sensitizing pollens would be encouraged.

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