IN THE NAME OF GOD

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Prevalence of House Dust Mite sensitivity in allergic patients in Kerman city, Iran.

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To my dear ***father & mother,***

Their support, inspiration and fondness make me indebted forever,

AND

To my dearest sister

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With my greatest love and appreciation to them all.

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Contents

Abstract

Allergy is a very common problem in the world and exposure to allergens especially aeroallergens such as House Dust Mites (HDMs) is a risk factor for developing it. Dermatophagoides pteronyssinus (D.p) and Dermatophagoides farinae (D.f) are recorded as the most frequent HDM species in Iran. The aim of this study was to determine the prevalence of D.p and D.f sensitization among allergic patients in Kerman city of Iran. One hundred and twenty one patients with a diagnosis of allergic rhinitis and/or asthma, were included and underwent skin prick test to determine sensitivity. Dermatophagoides sensitization was 17.4%, D.p was responsible for 15.7% and D.f for 9.9%. Concomitant sensitization to both allergens was 8.9%. Dermatophagoides sensitization especially D.p's can play a role in allergic patients in Kerman city, and education seems to be necessary to avoid HDM sensitivity even in desert areas with hot climate.

Keywords: Allergy, Dermatophagoides, House dust mite, Sensitization, Skin prick test.

Introduction

Allergy is a very common problem in the world. Allergic rhinitis is the most common allergic disorder which effects 10 % to 25 % of the population, but asthma (10 - 15 %) and conjunctivitis are less common (1). The prevalence of airway allergic diseases, such as bronchial asthma and allergic rhinitis, has increased in most industrialized countries, particularly in urban areas and developed countries (2 - 7).

The pathogenesis of asthma is associated with both genetic and environmental factors. Allergens are very important sensitizing agents in patients with asthma, and allergen sensitization is an important factor in asthma development (8, 9).Arthropod antigens are main allergens which induce allergic responses in susceptible humans (10). House Dust Mites (HDMs) contain allergens that are capable to induce allergic reaction in sensitized individuals (11, 12).

Analogous to occupational asthma, allergen avoidance in asthmatic children sensitized and exposed to mite allergens is associated with a reduction in airway hyper responsiveness and symptoms, associated with improvement in lung function (13), and also prevention of sensitization to dust mites might reduce the rising prevalence of asthma and allergic rhinitis (14). Modern life styles in urban areas have been considered potentially responsible for the development of airway allergic diseases due to proliferating HDMs and increasing concentrations of indoor air pollutants, such as respirable mite allergens or

tobacco smoke (2). However environmental control has been put forward as an integral part of the management of HDM allergy in sensitized patients (15).

Previous researches in Iran have shown, the three Pyroglyphid species, Dermatophagoides pteronyssinus (D.p), Dermatophagoides farinae (D.f) and Euroglyphus maynei, were found to occur in Iranian house dust and to account for nearly two-thirds of the total mite population present in the dust. Dermatophagoides pteronyssinus was the most frequent and most numerous species recorded (16). Kerman city is situated in a dry area with hot climate. Although HDMs live and proliferate in the humid area and temperate climate (4), but many studies have shown high prevalence of HDMs sensitivity in such areas.

Previous studies showed HDMs sensitivity in allergic patients in these areas as follows: 32.4%-39.2% in allergic rhinitis patients in Kuwait (17), 52.7% to D.p among atopic blood donors in Kuwait (18), 19% to D.p and 18% to D.f in allergic rhinitis and asthmatic patients in Karaj (19), 89.74% in Sistan-Baloochestan province in southeast of Iran (20), 35% in Isfahan (21), and 22.7% in chronic allergic rhinitis patients in Shiraz (22).

As detection of the common allergens in any region is critical for prevention and treatment of allergic diseases (21) and limited data is known about the prevalence of sensitization to common HDMs, D.p and D.f, in allergic patients in kerman city, this study is designed to determine it by using the skin prick test in patients with a diagnosis of allergic rhinitis and/or asthma.

Method and materials

We performed a cross-sectional study between April 2006 to February 2008.One hundred and thirty four patients with a diagnosis of allergic rhinitis and/or asthma from allergy outpatient clinics (Allergy Clinic of Afzalipour Hospital and physician's office) in Kerman city were included in our study. We explained the test and its complications for each patient and all of them agreed to participate in our study. Skin prick tests were done with two common HDM allergens in Iran (D.p and D.f). The patients were between 5 to 55 years old, and chosen by simple sampling. Diagnosis of allergy was according to previous confirmed diagnosis, or clinical symptoms. Allergic rhinitis was diagnosed by clinical symptoms, such as sneezing, episodic rhinorrhea, obstruction of the nasal passages with lacrimation, and pruritus of the conjunctiva, nasal mucousa, and oropharynx (23, 24 and 25).

Diagnosis of asthma was by symptoms, such as cough, dyspnea and wheezing plus demonstrating reversible airway obstruction, that is defined as a >=15% increase in FEV1 after taking two puffs of salbutamol (24,26).

Skin prick test was done, and a questionnaire was completed for each patient. A copy of translated questionnaire is presented in table number 1 (28). None of the subjects used medications such as antihistaminic drugs at least for 7 to 10 days before the test, which would mask sensitization. The patients didn't involve with active skin lesions, dyspnea, sever cough, or acute viral respiratory tract infection at the time of testing.

All the allergens, the standard negative solution and the positive control (1/1000 diluted histamine solution) were prepared by Stallergen (France). First of all the patients washed their forearm with water, and waited till it became dry. Single drops were put on volar surface of the forearm, spaced 3.5 cm from each other. Drops were D.p and D.f allergens, the positive and the negative controls. A lancet was used to scarify the skin just under the single drop, and then drop remnants were dried with a disposable handkerchief with caution that drops didn't mix with each other. The result was observed after 15 to 20 min. Positive prick test reactivity was defined as the presence of a mean wheal diameter of at least 5mm or 3mm in excess of the negative control (27). The patients with negative histamine test or positive dermographism were excluded from the study.

Chi-square and fisher exact tests were used for comparing categorical variables. At last for understanding correlation of multiple factors with sensitization, multivariate logistic regression analysis was used. Statistical analysis was performed by using SPSS 16 software.

Table 1.The questionnaire:

Identification data:

- Gender
- Age
- Occupation

Disease information:

- Kind of allergy (allergic rhinitis and/or asthma).
- Severity of the disease.

Smoking habits:

- Active, passive or no smoking.

Environment and domestic conditions:

- Kind of mattress and its cover.
- Kind of pillow and its cover.
- Kind of coverlets.
- Intervals of washing blankets and bed sheets.
- Water temperature in which they are washed.
- Drying clothing, blankets in the sunshine.
- If the patient's room is exposed to the sunshine.
- The floor cover.
- Kind of furniture.
- Kind and intervals of washing curtain.
- Intervals of cleaning closets and drawers with a damp cloth.
- Keeping all clothing in a closet with the door shut.
- Intervals of using vacuum cleaner for cleaning furniture and floor.
- Having things that collect dust such as bookshelf... in the bedroom.

Exposure to furred and house pets.

Air conditioning of the house:

- Kind of cooler.
- Using home humidifier.

Results

One hundred and thirty four patients, who were diagnosed as allergic rhinitis and/or asthma by clinical criteria, underwent skin prick test for two common species of Dermatophagoides in Iran (D.p and D.f) during the study period. Thirteen patients didn't show positive histamine test and were excluded from analysis. One hundred and twenty one patients were included, among them 59 (48.8%) were males, the study population characteristics are showed in table number 2.

Skin prick test results were positive for Dermatophagoides in 17.4% of patients (Table 3).

The questionnaire was for detecting effect of environmental factors on sensitization to dust mites, but we didn't find statistically significant difference between sensitive and nonsensitive patients.

Table 2. Study population characteristics:

Characteristic	Frequency (%)
Males	48.8
Disease	
• Allergic rhinitis	76.8
• Asthma	42.1
• Allergic rhinitis and asthma	22.3
Age	
• 5-18 (years)	37.2
• 19-35	34.7
• 36-55	28.1
Cigarette smoke exposure	21.5
Occupation	
• Unexposed to house dust	77.7
• Chemical exposure	5
• House dust exposure	17.4
Kind of pillow which permits HDM proliferation	44.6
Kind of furniture which permits HDM proliferation	66.1
Having furred pets	16.5

Table 3. Prevalence of sensitivity to HDMs in allergic patients in Kerman city:

D.p(pos)	D.f(pos)	D.p and D.f (pos)	D(neg)
15.7%	9.9%	8.2%	82.6%

Discussion:

According to our study sensitization to Dermatophagoides was 17.4%. Many studies have reported HDMs as the most important aeroallergens (31-34). Although there are many mites among house dust, the most allergenic species are D.p and D.f (9, 29, 30) and D.p is recorded as the most frequent species in Iran (20). We also found that D.p sensitization was more than D.f's (15.7% versus 9.9%). Skin prick test results were positive for HDMs at a rate of 30.9%-79.5% in various studies around the world (31-34). Also HDMs sensitivity in allergic patients in different parts of Iran varies (19-22).

Kerman province of Iran is located in southeast of Iran, and the center is Kerman city, which is almost a desert area with hot climate. Many studies have shown high prevalence of HDMs sensitivity in such areas. HDMs sensitivity was 89.74% in allergic patients in Sistan-Baloochestan (20). A study was done in Kuwait in 2000 which showed 32.4%-329.2% sensitivity to HDMs in

allergic rhinitis patients (18). Although Kerman is a desert area, but allergy prevalence is increasing here, according to other parts of the world, and HDMs sensitization is an important risk factor in the development and exacerbation of allergic diseases.

Our result is almost near the result of other studies in areas with the same climate in Iran, such as Karaj (19%) and Shiraz (22.7%). But high prevalence of HDMs in Sistan-Baloochestan may be as the result of high humidity (being in the neighbor hood of Omman Sea) also 35% sensitivity to HDMs in Isfehan can be explained by humidity due to Zayande-Rood River in the city.

Our study shows D.p plays a role in allergic patients in Kerman city. It may be as the result of using carpets in their furniture and for covering the floor. We didn't achieve any significant data from analysis of the questionnaire which could show the relationship between HDMs sensitivity and patient's environment. Our questionnaire data were based on the patients' responses, and actually their reliability could effect on accuracy of our data.

Our sample size was limited, and continuation of the study will help for recognition of some relationships. We have chosen our population by simple sampling, who were people with different kinds of jobs. Many of sensitized patients didn't spend much time in their homes to be influenced by the living environment, so some other factors may be responsible in sensitization to HDMs in this city other than these environmental factors. We suggest consideration of socioeconomic factors in future studies. We couldn't do serologic studies for our population to measure specific IgE and confirm skin

prick test results so we suggest performing these tests in future studies too. We also need researches on sensitization to other allergens in this city in addition to HDMs to determine the most important and popular allergens.

Conclusion:

Prevalence of D.p sensitization is considerable in the area and attempts should be done to educate allergic patients to avoid HDM sensitivity, even in desert areas with hot climate.

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