Annals of Medical Research

DOI: 10.5455/annalsmedres.2019.08.488 2020;27(3):903-6

Original Article

# Determination of aeroallergen prevalence in children aged 1-16 years in the provincial center of Kahramanmaras

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**Abstract**

**Aim:** A retrospective study was performed to determine of aeroallergens sensitivity in children.

**Material and Methods:** Medical records of patients aged 1-16 years who presented at the Paediatric Allergy Polyclinic of Kahramanmaraş Children's Hospital between August 2015 and July 2016. A 10-item allergy test was applied to patients. These tests were positive control (histamine), negative control (saline), grass, weed, house dust mite mixture, peanut, cockroach, alternaria, aspergillus, and cat epithelium and dog hair. The patients were separated into 3 groups as asthma, allergic rhinitis and asthma and allergic rhinitis combined.

**Results:** A total of 1078 patients were administered the allergy tests. A positive result in the allergy skin test was determined in 311 patients. The male/female ratio was 199/112 (64%/36%) in the positive allergy test. Allergic rhinitis was determined in 144 (46.3%). The mean age of the patients was 6.6 ± 3.51 years in the asthma group, 10 ± 3.81 years in the allergic rhinitis group and 9.3 ± 3.89 years in the asthma +allergic rhinitis group. Grass pollen was the most frequently determined aeroallergen in all the patient and age groups. In the pre-school age group, the patients diagnosed with asthma were determined with the most aeroallergen sensitivity. In the patients diagnosed with both asthma and allergic rhinitis, house dust mite mixture was the 2nd most frequently determined aeroallergen in both pre-school and school-age children.

**Conclusion:** In the region of Kahramanmaraş, it was significant that the most commonly determined aeroallergen was mixture 5 grasses in our study.

**Keywords:** Aeroallergens; allergic rhinitis; asthma; childhood; skin prick test

## INTRODUCTION

Asthma is a significant cause of morbidity in childhood. It is one of the most widespread chronic diseases of childhood leading to approximately 14 million/days of school absence and creating a severe economic cost. A detailed history, physical examination and adjuvant tests (liver, bile duct and renal function tests, complete blood count, urine and stool sample analysis etc.) are necessary for diagnosis. Indoor and outdoor allergens are important triggers of childhood asthma especially for children aged over 3 years. These allergens, such as house dust mites, cockroaches, rodents, other animals (cat, dog etc), pollen, aspergillus, suspicous allergens that are frequently encountered in daily life. Room sprays and deodorants are Previous studies have shown that specific allergen exposure is an important risk factor for asthma morbidity and implementations to reduce the risk of exposure to these allergens have been determined to improve the asthma outcomes (1, 2).

Allergic rhinitis, also known as allergic rhinosinusitis, is a condition characterized by watering eyes, itching nose and palate, sneezing, nose bleeds and nasal blockage accompanied by paroxysms. It is a significant problem involving a section as large as 10%-30% of society. In the USA it has been reported to lead to 6 million/day school absences. Patients with house dust mite allergy and especially pollen allergies are seen at high rates. Just as in asthma, avoiding these allergens is important in reducing the need for treatment (2, 3).

School absenteeism and medical treatment costs of asthma and allergic rhinitis are increasing every year. Therefore, a simple and inexpensive method of determining the specific allergen in both cases is important in respect

**Received:** 22.08.2019 **Accepted:** 13.02.2020 **Available online:** 13.03.2020
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of reducing costs and the need for treatment (4, 5). The aim of the study is an evaluation of allergens detected in skin prick test in children diagnosed with asthma and / or rhinitis in Pediatric Allergy Polyclinic.

## MATERIAL and METHODS

A retrospective examination was made of the records of patients aged 1-16 years who presented at the Pediatric Allergy Polyclinic of Kahramanmaraş Children's Hospital between August 2015 and July 2016. Patients diagnosed with asthma according to Global Initiative for Asthma (GINA) 2016 guideline (6). Pulmonary function test (FEV1) was performed in patients older than 7 years. Pulmonary function variables were measured, using a spirometer (ZAN 100, Me, grerate GmbH, Germany). A 10-item allergy test (Allergopharma GmbH & Co. KG, Reinbek, Germany) was applied to patients. Doctors discontinued drugs affecting skin reactivity in the patients before the test. These tests were positive control (histamine), negative control (saline), grass, weed, house dust mite mixture, peanut, cockroach, alternaria, aspergillus, and cat epithelium and dog hair. A nurse administers the test with applicator and allergy - immunology doctor interprets the results. The patients were separated into 3 groups as asthma, allergic rhinitis and asthma and allergic rhinitis combined. The patients were categorized according to the criteria presented in Table 2. Approval for the study was granted by the Ethics Committee of Kahramanmaraş Sütcü Imam University Medical Faculty. Written consent form obtained from the families of the patients.

### Statistical Analysis

The data obtained in the study were analysed using IBM SPSS for Windows version 22.0 software (IBM statistics for Windows version 22, IBM Corporation, Armonk, New York, USA). Conformity of the data to normal distribution was examined visually (histogram) and with analytical methods. Descriptive analyses for variables with normal distribution were stated as mean ± standard deviation (SD).

## RESULTS

A total of 1078 patients were administered the allergy tests (Figure 1). A positive result in the allergy skin test was determined in 311 patients. The male/female ratio was 645/433 (59.8%/40.2%) in the total 1078 patients and 199/112 (64%/36%) in the 311 patients with a positive allergy test. Of the 311 patients with positive test findings, allergic rhinitis was determined in 144 (46.3%).

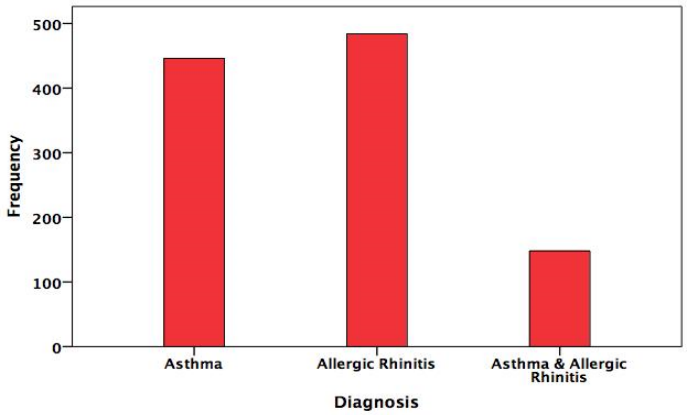


**Figure 1.** Distribution of the diagnoses of patients undergoing allergy testing.

The mean age of the patients was 6.6 ± 3.51 years in the asthma group, 10 ± 3.81 years in the allergic rhinitis group and 9.3 ± 3.89 years in the asthma +allergic rhinitis group. The patients were divided into two groups of pre-school age (1-6 years) and school age (7-16 years) according to the diagnoses and the specific aeroallergen sensitivity of the age groups was investigated. Grass pollen was the most frequently determined aeroallergen in all the patient and age groups.

In the pre-school age group, the patients diagnosed with asthma were determined with the most aeroallergen sensitivity. The second most common aeroallergen in the asthma patients was the house dust mite mixture in both the pre-school and school age children. While alternaria was the 4$^{th}$ most commonly seen in pre-school children, this increased to 3$^{rd}$ ranking in school age children (Table 1).

In the school age children, the patient group with the most skin prick test positivity was the allergic rhinitis group. Weed pollen sensitivity was the lowest determined aeroallergen in the pre-school children and the 2$^{nd}$ most frequently determined aeroallergen in school age children in the patients diagnosed with allergic rhinitis (Table 2).

**Table 1. Distribution of aeroallergen sensitivity in the patients diagnosed with asthma**

| n: 113 | Grass pollens (%) | Weed pollens (%) | House dust mite mixture (%) | Cockroach (%) | Alternaria (%) | Aspergillus Mix (%) | Cat epithelium (%) | Dog hair (%) |
|---|---|---|---|---|---|---|---|---|
| Pre-school age children N: 64 | 47 | 20 | 42 | 13 | 16 | 14 | 3 | 2 |
| School age children N: 49 | 59 | 18 | 51 | 12 | 22 | 16 | 5 | 3 |

**Table 2. Distribution of aeroallergen sensitivity in the patients diagnosed with allergic rhinitis**

| n: 144 | Grass pollens (%) | Weed pollens (%) | House dust mite mixture (%) | Cockroach (%) | Alternaria (%) | Aspergillus Mix (%) | Cat epithelium (%) | Dog hair (%) |
|---|---|---|---|---|---|---|---|---|
| Pre-school age children N: 27 | 59 | 4 | 19 | 7 | 11 | 15 | 4 | 3 |
| School age children N: 117 | 74 | 21 | 16 | 7 | 14 | 6 | 3 | 2 |

**Table 3. Distribution of aeroallergen sensitivity in the patients diagnosed with asthma and allergic rhinitis**

| n: 54 | Grass pollens (%) | Weed pollens (%) | House dust mite mixture (%) | Cockroach (%) | Alternaria (%) | Aspergillus Mix (%) | Cat epithelium (%) | Dog hair (%) |
|---|---|---|---|---|---|---|---|---|
| Pre-school age children N: 16 | 63 | 13 | 25 | 13 | 13 | 0 | 9 | 4 |
| School age children N: 38 | 74 | 21 | 21 | 5 | 13 | 5 | 3 | 2 |

In the patients diagnosed with both asthma and allergic rhinitis, house dust mite mixture was the 2nd most frequently determined aeroallergen in both pre-school and school-age children, and aspergillus sensitivity was not determined in any of the pre-school children. A reduced frequency of sensitivity to cockroach and cat-dog epithelium was determined in school-age children compared to those of pre-school age (Table 3).

## DISCUSSION

In this study, sensitivity to one or more aeroallergens was determined in 28.8% of the patients applied with the skin prick test (SPT). Asthma is known to be exacerbated by atopy and allergen exposure, and allergic rhinitis is a known risk factor for relapse of asthma after remission. Consequently, school absences are increasing in school-age children and there are increasing healthcare costs. The prevalence of atopy (defined as at least one positive SPT) in paediatric asthma patients has been reported to range from 24% to 79% and cases of asthma attributable to atopy have been reported at rates in the range of 26% -63% in population-based studies (2, 4).

In all the patient groups and age groups of the current study, mixture 5 grasses was the most commonly determined aeroallergen. As stated in previous studies, the most likely factor in the frequent determination of mixture 5 grasses was evaluated as increased exposure of the patient to an outdoor environment (3, 5, 7). The significant increase in school age children of the number of patients both with allergic rhinitis and the combination of asthma and allergic rhinitis and that mixture 5 grasses aeroallergen sensitivity was most frequently determined in these patients supports this view.

In asthma patients, house dust mites were the second most commonly determined aeroallergen in both the pre-school and school-age periods. In the school-age children, in contrast to the reduction in the number of SPT positive patients diagnosed with asthma, sensitivity to house dust mites increased (analyzed for indoor allergens using multiplex array technology) (8). Indoor allergens were reported at least as frequently as outdoor allergens. A previous study reported that in regions where there was intense urbanization and increased humidity, there was an increase in sensitivity to house dust mites (3, 9). In western countries with intense urbanization, studies have reported house dust to be the most frequently determined aeroallergen (4). In western regions of Turkey with high levels of urbanization, house dust mites has been determined as the most commonly determined aeroallergen and in our region which has a hot climate, mixture 5 grasses was the most often determined (7). Kılıç et al. (10) found on the SPT, sensitization to grass pollens was found in 60.1%, cereals pollens in 57.2%, and *Dermatophagoides farinae* in 21.8% of the patients in Eastern regions of Turkey.

Alternaria and aspergillus aeroallergens are allergens which show great differences according to the regions of countries and it is important that sensitivity is determined from the early stages in asthma patients (11-13). As in previous studies, both Alternaria and aspergillus sensitivity was determined more often in asthma patients than in allergic rhinitis patients in our study.

In both the asthma and allergic rhinitis patients in the current study, cat-dog epithelium was the least detected aeroallergen. In many previous studies, sensitivity to cat epithelium and dog hair has been determined more often. This result in the current study can be attributed to sociocultural reasons in the region. Nevertheless, it is important that the sensitivity decreased in the school-age period in the allergic rhinitis and the combined asthma and allergic rhinitis patients.

## CONCLUSION

Results of this study, which was the most comprehensive to have been conducted to date in the region of Kahramanmaraş, it was significant that the most commonly determined aeroallergen was mixture 5 grasses. House dust mites can be prevented as an indoor factor and that

they were present at a high rate in asthma patients is important. However, it can be considered that a reduction in outdoor exposure in particular will reduce symptoms and the frequency of attacks, thereby contributing to school attendance and the national economy.

*Competing interests: The authors declare that they have no competing interest.*

*Financial Disclosure: There are no financial supports.*

*Ethical approval: The study was approved by Local Ethical Committee (KSU 2017/ 17/13).*

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