

## Allergen profile in Duzce province of Turkey.

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### Abstract

**Purpose:** To explore respiratory allergen profile and the relation between the month of birth and allergen type in Duzce Province in Turkey.

**Methods:** The data of 310 patients, who applied with respiratory allergic disease complaints in Düzce province of Turkey between May 2014 and May 2016, were retrospectively reviewed. Among them, 303 people were detected to have a full birth date in day, month and year in the hospital software. Remaining seven people were excluded from the study as they only had their year of birth recorded.

**Results:** 183 of 303 subjects (60.4%) included in the study were men and 120 (39.6%) were women. The most frequent reaction was detected against *D. Farinea* in 43 subjects (14.2%) Other common reactions were detected against *D. Pteronyssinus* with 35 subjects (11.5%); against grass with 19 subjects (6.3%); against grains with 19 subjects (6.3%); and against weeds with 16 subjects.

**Discussion:** It was proved that the month of birth of those who were included in the study and detected to be allergen affected the allergen distribution.

**Keywords:** Allergy, Birth month, House mite, Hypersensitivity.

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### Introduction

Respiratory allergy is a condition that is seen in all age groups around the world and the frequency increases [1]. Immediate hypersensitivity reactions against allergens are prevalent in children and young adults with asthma and rhinitis. Atopy is the tendency to develop allergic asthma, allergic rhinoconjunctivitis and atopic dermatitis by causing type I hypersensitivity against specific allergens with the effect of environmental factors in individuals with genetic susceptibility [2]. It is considered that the occurrence of sensitivity against major indoor allergens (like dust mites, cat, dog or cockroach) is the most critical risk factors in the development of asthma [3]. The variety of environmental factors which play a role in allergy leads to difficulties in the diagnosis and treatment of the factor [4]. In allergic diseases, it is possible to detect different allergen spectra in different regions depending on the regional differences such as climate, flora, moisture and high altitude [5].

Skin prick test is a reliable method; despite the systemic reactions encountered, no deaths were reported [6]. Avoiding allergens is suitable for symptomatic patients with allergies detected through a positive skin test or specific IgE antibodies in the serum. The pollen type and number outdoor vary regarding the region, temperature, and climate. The pollen concentration in the atmosphere significantly varies depending on the flora, precipitation, wind direction and speed in the current geographical region [7,8]. Besides, there are other factors related to the allergens and their distribution.

In our study, we planned to present a different condition which may be related to the allergen. In our study, we intended to reveal the relationship between the date of birth and the allergens.

### Methods

The files of 310 patients who applied with respiratory allergic disease complaints between May 2014 and May 2016 in Duzce province of Turkey were reviewed retrospectively. The patients who were considered to have underlying allergic asthma and allergic rhinitis were included. A total of 303 patients with full date of birth recorded in a day, month and year were included. Others (7 people) who only had their year of birth recorded were excluded from the study. Allergen extracts were applied epicutaneously using single prick test applicators. The assessment was made 15 min later. Histamine hydrochloride was used as positive control, and isotonic was used as negative control. Positive control >3 mm and negative control <3 mm was accepted as the validity criteria of the test. The skin reaction to an allergen, for which the induration diameter was 3 mm or above, was considered as a positive response [9]. The study was conducted by considering the medications which interrupt the skin tests and by complying with special conditions before the application of the prick test; 15 d for antihistaminic drugs; one week for antidepressants, and three days for drugs containing montelukast. Those who were pregnant or who had active skin disease were excluded from the study. In the prick test, most common 30 allergen extracts, as well as negative and positive control extracts, were used.

House dust mites (*D. Farinea*, *D Pteronyssinus*), grass pollen mixture (*Cynodon dactylon*, *Fescue*, *Lolium perenne*, Timothy-grass, *Poa annua*), tree pollen mixture (Birch tree, Poplar, Hazel tree, Oak, Elm tree, Ash tree, Alder tree, Willow, Fagus, Maple tree, Juniper, Sambucus, Pine), weed pollen mixture (Mugwort, Pigweed, Pellitory), cockroach, *Aspergillus fumigatus*, grain allergens mixture (oat, barley, wheat, rye), egg white and egg yolk were used as allergy extracts.

SPSS 15.0 Windows package program was used for the statistical analysis. In the analysis of the variables between genders, the  $\chi^2$  test was used, and the difference was considered as significant when it was  $p < 0.05$ . The months of the birth of those included in the study, and the allergen positivity and diversity were compared.

## Results

183 (60.4%) of 303 subjects included in the study were men, and 120 (39.6%) were women. In 132 subjects tested (43.6%), the skin prick test response was detected positive. In Table 1, the allergen distribution and the percentages of men and women are given. In our study, the most frequent reaction detected in the prick test results of the subjects applied with allergy complaint was against house mites (*D. Farinea* ve *D. pteronyssinus*).

Allergen positivity between men and women did not differ significantly for any allergen (Table 1). The months of the birth of the subjects tested and the skin test results are presented in Table 2. The higher rate of allergen positivity percentage was detected in January, February, and March (Table 2).

**Table 1.** Comparison of allergic reactions regarding gender.

	Male	Female	p
	n (%)	n (%)	
<i>D. Farinea</i>	26 (14.2)	17 (14.1)	>0.05

**Table 3.** The distribution of allergens by months.

Allergens	n	Months											
		1 <sup>st</sup>	2 <sup>nd</sup>	3 <sup>rd</sup>	4 <sup>th</sup>	5 <sup>th</sup>	6 <sup>th</sup>	7 <sup>th</sup>	8 <sup>th</sup>	9 <sup>th</sup>	10 <sup>th</sup>	11 <sup>th</sup>	12 <sup>th</sup>
<i>D. Farinea</i>	43	10	9	2	3	0	2	2	2	0	0	3	11
<i>D. Pteronyssinus</i>	35	7	7	4	3	1	0	1	1	1	1	2	8
Grass	19	0	1	6	5	5	2	0	0	0	0	0	0
Grain	19	1	1	2	2	2	4	4	2	1	0	2	1
Weed	16	0	1	1	1	1	0	0	1	4	4	1	0

## Discussion

Atopy term is defined as the tendency of people to develop allergic asthma, allergic rhinitis, allergic conjunctivitis and atopic dermatitis by Coca and Cooke in 1923 [10]. It was reported that immigration might also change the allergen profile [11]. Its relationship with lifestyle, diet, and hygienic

<i>D. Pteronyssinus</i>	21 (11.5)	14 (11.7)	>0.05
Grass	11 (6.0)	8 (6.6)	>0.05
Grain	11 (6.0)	8 (6.6)	>0.05
Weed	9 (4.9)	7 (5.8)	>0.05
Total	78 (42.6)	54 (45.0)	>0.05

**Table 2.** Comparison of skin prick test results regarding month of birth.

Month	Total test (n)	Positive test (n)	Positive test (%)
January	29	18	62
February	21	19	61.3
March	36	15	57.7
April	25	14	56
May	18	9	50
June	21	8	38.1
July	19	6	31.5
August	30	4	13.3
September	27	6	22.2
October	22	5	22.7
November	19	8	50
December	36	20	55.5

The relation of allergens as per months of birth is given in Table 3. Through the findings in Table 3, it was determined that house mites be more frequent in subjects born in December, January, and February. Grass allergy was detected in the subjects who were born in March and April.

ambient conditions was demonstrated by epidemiological studies. The prevalence of atopy in the last 20 y in developed countries had increased by ten times, indicating that the environmental factors are influential in allergy development [12,13].

The age of the subject is a factor that affects the prick test results. The allergy sensitivity during childhood increases by age and constitutes a plateau during adult age period. In general, sensitivity gradually decreases after the age of 50 or 60. Nonetheless the results of the allergy tests conducted at such ages are also reliable [14]. In many studies conducted in Turkey, allergy reactions at different ratios were reported in patients with atopy complaints. The allergy positivity ratio detected by some of them is 29.3%, 35%, 56.4% and 56.7% [15-18]. We detected positivity at least in one allergy in 42.9% of the prick test results in Düzce Province in Turkey. The possible reason for the differences in the ratios may be dependent on the variety of the allergens in the inhabited region, or to the allergy severity or allergy exposure period of the patients applying to the physician. When we analysed the results, Mirici et al. [19] detected sensitivity against pollen mixture by 70.3% (grass and tree) in Erzurum province; Bayram et al. [16] most frequently detected sensitivity against pollens by 69.2% (tree pollens by 53.3%, weeds and grasses by 45.8%, and grain pollens by 24.2%) and against house mites by 56.7% in Kayseri; Ceylan et al. [20] detected sensitivity against grass pollens by 87.5%, weed pollens by 2.3%, tree pollens by 2.3% in Sanliurfa; Cicek et al. [15] detected sensitivity to house dust by 18.1% and grass pollens by 13.8% in Elazig.

We detected sensitivity against *D. Farinea* in 43 subjects (32.6%), *D Pteronyssinus* in 35 subjects (26.5%), grass in 19 subjects (14.4%), grain in 19 subjects (14.4%) and against weed mixture in 16 patients (12.1%). While tree pollens come to the forefront in Kayseri, weed pollens significantly step forward in Sanliurfa [16,19,20]. In Antalya, which is close to the sea level, sensitivity against house mites stand out [5].

The different and the most critical perspective of our study was to exhibit the existence of a relation between the months that the allergens increase in nature and cause hypersensitivity and the months of birth. Therefore, we evaluated the relation of the months of the birth of those participating in the study and the allergen distribution percentage. As a result; higher allergy percentages were detected in January (62.0%), February (61.3%) and in March (57.7%) compared to other months. In our study, the occurrence of house mites with significantly higher percentages in December (95.0%), January (94.4%) and in February (88.8%) was remarkable. This situation may be explained by more time spent in the house by the people born in these months. Another striking result was the considerable increase in grass allergy in March and April and the prominence of weeds between August and October compared to other months. That may also be considered as proof that the amount and the influence rate of the allergen currently exist in nature on the month of birth is directly proportional to the individual's allergen profile. Besides, in another study conducted in Düzce, the sensitivity against house mites stands out again [18]. Karachaliou et al. [21] proved that the reaction to seasonal allergens of 1755 people with the atopic disease (asthma, atopic dermatitis, and allergic rhinitis) was affected by their months of birth. They presented that in Greece, the delivery months with high risk for atopic development were

between May and August; on the other hand, they reported that common aeroallergens sensitivity was detected higher in March, mixed weeds between March and August, and *D. Pteronyssinus* between May and August. Businco et al. [22] proved that allergen sensitivity against house mites and pollens was affected from the month of birth. They retrospectively detected positive skin test in 1685 of 2124 children with respiratory allergy between 1964 and 1985 in Rome. Sensitivity was detected for mites between June and September and for grass pollens between March and May. Quoix et al. [23] found a correlation between the seasonal difference of fungus and grass pollens and the month of birth. There were no significant results reported for other allergens. Eriksson et al. [24] investigated the relation of positivity of inhaled allergens and the date of birth, gender, and age in 7099 adults with asthma or allergic rhinitis. They found a relation between pollens and month of birth.

In conclusion, we found a relation the months of birth and the allergen types. Our study provides data on the allergen sensitivity results in Düzce Province.

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