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Evaluation of clinical and demographic characteristics in children with aeroallergen sensitization: A study based on skin prick test results

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Abstract
Objective: This study aimed to evaluate the demographic and clinical features of pediatric aeroallergen sensitization and seasonal symptom patterns, focusing on pollen.
Materials and methods: This retrospective single-center study included children aged 1–18 years who underwent standardized skin prick testing (SPT) between January 2020 and July 2021. Patients with chronic or immunological disorders other than asthma, allergic rhinitis (AR), and atopic dermatitis (AD) were excluded. Clinical and laboratory data, including symptom profiles, family atopy history, eosinophil counts, and total IgE, were extracted from records. Aeroallergen panels included pollens, house dust mites, molds, and animal dander. Comparisons were performed between monosensitized and polysensitized patients, and between those sensitized to pollen versus house dust mites.
Results: Of 2247 children tested, 2017 were eligible, and 500 (24.7%) with clinically relevant sensitization were analyzed (57% male; median age: 12 years, IQR: 8–15). Pollen was the most frequent sensitizer (78.6%), followed by house dust mites (36.6%). Within pollens, Poaceae predominated (98.1%), with Secale as the leading species (88.4%). Seasonal peaks of symptoms in pollen-sensitized patients occurred in May (31.8%), April (29.6%), and June (27%). Polysensitization was observed in 38.8%. AR was the most common diagnosis (83.2%), while asthma and AD were present in 36.4% and 34.0%, respectively. Pollen sensitization was significantly associated with AR (88% vs. 63%, $p < 0.01$) and sneezing (38% vs. 16%, $p < 0.01$), whereas house dust mite sensitization was more often linked with skin rashes (25.5% vs. 13%, $p = 0.008$). Patients with eosinophilia were younger, predominantly male, and more frequently diagnosed with AR ($p < 0.001$).
Conclusions: Pollen, particularly from the Poaceae family, was the predominant aeroallergen, and symptom timing matched seasonal pollen trends. Inclusion of region-specific pollens such as Secale in SPT panels is crucial for accurate sensitization detection and for guiding localized public health strategies.

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Introduction

The prevalence of allergic diseases has increased dramatically worldwide, particularly among children, posing significant public health challenges. Allergic conditions such as asthma, allergic rhinitis (AR), and atopic dermatitis (AD) require a comprehensive understanding of their underlying contributing factors.[1] Aeroallergens, including pollen, house dust mites, mold spores, and pet dander, are major triggers of allergic reactions and are recognized as key contributors to the global burden of allergic diseases, including asthma, AR, and conjunctivitis. Sensitization to aeroallergens plays a critical role in the development of airway allergic diseases in children, and is also considered a risk factor for conditions such as AD.[2-4] Early identification of specific aeroallergen sensitizations is essential for predicting disease progression and implementing cost-effective treatment strategies. Diagnostic tools such as skin prick testing (SPT) and serum-specific IgE measurements are commonly used to detect allergen sensitization.[5] The predominant types of allergens vary depending on factors such as age, disease phenotype, and geographic location. For accurate and cost-effective diagnosis, allergen testing should be tailored based on regional, age-related, and disease-specific characteristics.[6] Therefore, there is a growing need for region- and age-specific studies on aeroallergen sensitization. This study aimed to evaluate the demographic and clinical characteristics of pediatric patients sensitized to aeroallergens and to analyze the seasonal variation in symptoms, with a particular focus on pollen sensitization. The findings are expected to provide region-specific insights that may guide the development of tailored management strategies for allergic diseases.

Materials and Methods

Study design and data collection

This retrospective observational study was conducted at a single-center tertiary Pediatric Allergy and Immunology Clinic. Institutional review board approval was obtained from the local ethics committee (Decision number: E-23-1220).

The study included children under 18 years of age who underwent SPT for aeroallergen sensitization between January 2020 and July 2021. Only children with a positive SPT result were included to characterize the clinical manifestations associated with allergen sensitization. Patients with chronic or immunological disorders, except for asthma, AR, and AD, were excluded from the study during the initial screening phase and were not subjected to the SPT.

The aim was not to assess the prevalence of sensitization in the general population, but to evaluate the clinical relevance of sensitization in symptomatic children referred to the allergy clinic. Complete blood counts were performed within 1 week before or after the SPT in all included patients, as part of the routine allergy evaluation protocol in our clinic. Patients' data were collected using a standardized form filled out during clinic visits. This form captured demographic details, reasons for admission, clinical features, atopic family history, birth-related details (delivery type, gestational age, and birth weight), along with eosinophil counts. (Eosinophilia was defined as an absolute count ≥ 400 cells/mm^3 or a relative percentage ≥ 4%).

Additionally, patients were questioned regarding the timing of nasal, ocular, and respiratory symptoms in relation to their pollen sensitization status. To ensure consistency and data integrity, two independent researchers reviewed the records.

Comparisons of symptom timing were limited to monosensitized patients and those with polysensitization to pollen due to the complexity of interpreting seasonal symptoms in patients sensitized to multiple nonpollen aeroallergens.

Skin prick test

The SPT was performed on the volar surface of the forearm in older children and on the back in younger children. A lancet was used to apply a drop of standard allergen extract onto the skin. After a waiting period of approximately 15 min, the diameters of the wheal and erythema were measured. Histamine was used as a positive control, and isotonic saline served as a negative control. The test was considered positive if the wheal diameter was ≥3 mm or larger than that of the negative control.[4]

The allergen panel was tailored according to each child's age and clinical history. For younger children, particularly those under 2 years of age, the panel was limited to the most relevant indoor allergens (e.g., house dust mite, mold, pet dander) based on exposure history.

Pollens tested in this study were categorized according to detailed taxonomic classification.[7] The comprehensive pollen panel included Ambrosia, Artemisia, Chenopodium, Composite mix, Cupressus, Cynodon, Fraxinus, Gramineae, Grass, Olea, Parietaria, Phleum pratense, Plantago, Salsola, Secale, and Tree-mix in addition to pollens. Other important allergens were also tested, including:

- **House dust mites**: Dermatophagoides farinae (DF) and Dermatophagoides pteronyssinus (DP)
- **Storage mites**
- **Animal dander**: Cat and dog epithelium
- **Mold spores**: Alternaria, Aspergillus, and Cladosporium

Allergic disease

Allergic diseases were retrospectively diagnosed based on clinical records, using established diagnostic criteria: the GINA 2021 guidelines for asthma, Hanifin–Rajka criteria for AD, and the ARIA 2019 guidelines for AR.[8-10] This approach ensured diagnostic consistency across the study population. In our study, the diagnoses of asthma and AR—particularly in younger children—were made by pediatric allergy specialists using a combination of clinical assessment, symptom history, physical examination findings, and SPT results. SPT positivity alone was not used as a

diagnostic criterion but was considered supportive when consistent with the clinical presentation. Despite having undergone SPT, a small number of children were excluded from the final analysis (n = 13) due to the absence of typical allergic symptoms. These tests were performed due to a strong family history of atopy and the presence of non-specific symptoms that warranted allergy evaluation. Since these patients did not fulfill the diagnostic criteria for any specific allergic disease, they were excluded to maintain the focus on clinically relevant sensitization. Additionally, patients with incomplete or missing standardized data collection forms were excluded from the analysis.

Statistical analysis

Data were analyzed using the Statistical Package for the SPSS software, version 25.0. Pearson's chi-square (χ^2) and Fisher's χ^2 tests were used for qualitative data. Descriptive statistical methods (frequency, percentage, mean, standard deviation, median, and min-max) were used to summarize the data. Normal distribution was assessed using the Kolmogorov–Smirnov and Shapiro–Wilk tests. Quantitative data with normal distribution were analyzed using the Independent Samples t-test and repeated measures analysis of variance (ANOVA) to compare repeated measurements. The Mann–Whitney U and Friedman tests were used for non-normally distributed data and repeated measurements, respectively. Pearson or Spearman's rho correlation tests were used to explore the relationships between the variables. Statistical significance was set at $p < 0.05$.

Results

Of a total of 2247 SPTs performed during the study period, 230 patients were excluded as they were under 1 year of age. Among the remaining patients, 513 (25.4%) were found to be sensitized to at least one aeroallergen. Thirteen of these 513 patients were excluded from further analysis because they did not report nasal, ocular, respiratory, or eczema-related symptoms during the clinical evaluation, indicating a lack of clinical relevance. Therefore, the final analysis included 500 patients (24.7% of the initial population), as illustrated in Figure 1.

Demographic Characteristics

Of the 500 patients included in the study, 57% (n = 285) were males, with a median age of 12 years (IQR: 8–15 years). At the time of presentation, 71 patients (14.2%) had asthma, 55 (11.0%) had AR, 25 (5.0%) had food allergies, and 24 (4.8%) had drug allergies. By the end of the study, the overall prevalence of AR, asthma, and AD was 83.2% (n = 416), 36.4% (n = 182), and 34.0% (n = 170), respectively, as presented in Table 1.

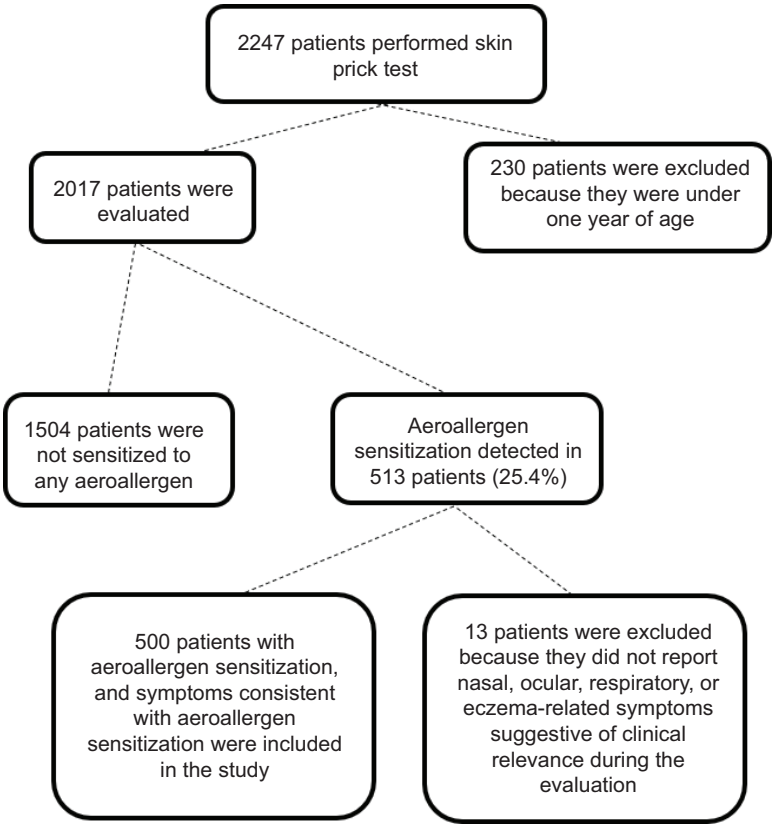

Figure 1 Flowchart of patient selection.

Symptoms and aeroallergen sensitization

The predominant symptoms leading to admissions were sneezing (n = 155, 31%) and dyspnea (n = 147, 29.4%). Sensitization to pollen was the most prevalent (n = 393, 78.6%), followed by house dust mites (n = 183, 36.6%), as presented in Table 1. Among pollens, secale was the most frequently identified (n = 351, 88.4%), while artemisia was the least common (n = 7, 1.7%), as illustrated in Figure 2.

Aeroallergen-specific findings

Among house dust mites, DP was the most commonly detected allergen. However, DF sensitization was more prevalent in children aged 61–144 months, with a rate of 28.3%. Compared to pollen, house dust mites, and animal dander, mold sensitization was less frequently observed in the study population. Among the mold species, Alternaria was the most commonly identified allergen (n = 44, 88%). Notably, no mold sensitization was observed in children aged 0–24 months.

Table 1 Demographic and clinical characteristics of the patients.

Clinical features	Values
Age (month) (Median (IQR))	144 (96–180)
Gender (male), n (%)	285 (57)
Family atopy, n (%)	329 (65.8)
At presentation atopic disease, n (%)	165 (33)
Allergic rhinitis, n (%)	55 (11)
Asthma, n (%)	71 (14.2)
Atopic dermatitis, n (%)	-
Food allergy, n (%)	25 (5)
Drug allergy, n (%)	24 (4.8)
Presenting complaints	
Sneezing, n (%)	155 (31)
Dyspnea, n (%)	147 (29.4)
Skin rash, n (%)	83 (16.6)
Cough, n (%)	61 (12.2)
Nasal congestion, n (%)	59 (11.8)
Nasal obstruction, n (%)	56 (11.2)
Itching of skin, n (%)	51 (10.2)
Itching of eye, n (%)	41 (8.2)
Discharge of eye, n (%)	33 (6.6)
Nasal itching, n (%)	29 (5.8)
Redness of eye, n (%)	26 (5.2)
Eczema, n (%)	4 (0.8)
Final diagnosis of patients, n (%)	
Allergic rhinoconjunctivitis, n (%)	416 (83.2)
Asthma, n (%)	182 (36.4)
Atopic dermatitis, n (%)	170 (34)
Total IgE, (IU/ mL) (Median (IQR))	210 (79–520)
EO % (Median (IQR)	3.7 (2–7)
EO (/mm^3) (Median (IQR))	260 (120–470)
Frequency of aeroallergens, n(%)	
Pollen, n (%)	393 (78.6)
House dust mite, n (%)	183 (36.6)
Pet dander, n (%)	111 (22.2)
Mold, n (%)	50 (10)
Polysensitization, n (%)	194 (38.8)
Monosensitization, n (%)	306 (61.2)

EO: Eosinophil; IQR: Interquartile range.

Polysensitization

Polysensitization was identified in 38.8% (n = 194) of the patients, indicating that a substantial proportion of the study population was sensitized to multiple allergens, as presented in Table 1.

Comparison of patients with and without eosinophilia

Patients with eosinophilia were significantly younger ($p < 0.001$) and predominantly males ($p < 0.001$). Eosinophilia was also more prevalent among patients diagnosed with AR ($p = 0.001$), as summarized in Table 2.

Comparison of monosensitized and polysensitized patients

Polysensitized patients had significantly higher total IgE levels compared to monosensitized patients ($p < 0.001$). The median age was the same in both groups; however, age variability was significantly higher in the polysensitized group than in the monosensitized group ($p = 0.045$), as presented in Table 3. No significant differences were observed between the two groups in terms of sex distribution, prevalence of atopic diseases, and eosinophilia levels.

Comparison of patients sensitized only to house dust and only to pollen

A diagnosis of AR (88% vs 63%; $p < 0.01$) and sneezing symptoms (38% vs 16%; $p < 0.01$) were significantly more common in the pollen-sensitized group. Conversely, eczematous symptoms were observed more frequently in the house dust mite–sensitized group (25.5% vs 13%; $p = 0.008$). No significant differences were found between the two groups in terms of gender, age, family history of atopy, or asthma frequency, as presented in Table 4.

Comparison between patients according to diagnosis

Patients were categorized into three groups: asthma only, AR only, and asthma with AR. Sensitization to house dust mites was significantly more common in the asthma-only group (57.6%, $p = 0.001$), whereas pollen sensitization was significantly more prevalent in the AR-only group (85.7%, $p = 0.012$). No significant differences were identified between the groups in terms of gender, age, or sensitization to molds and animal dander, as presented in Table 5.

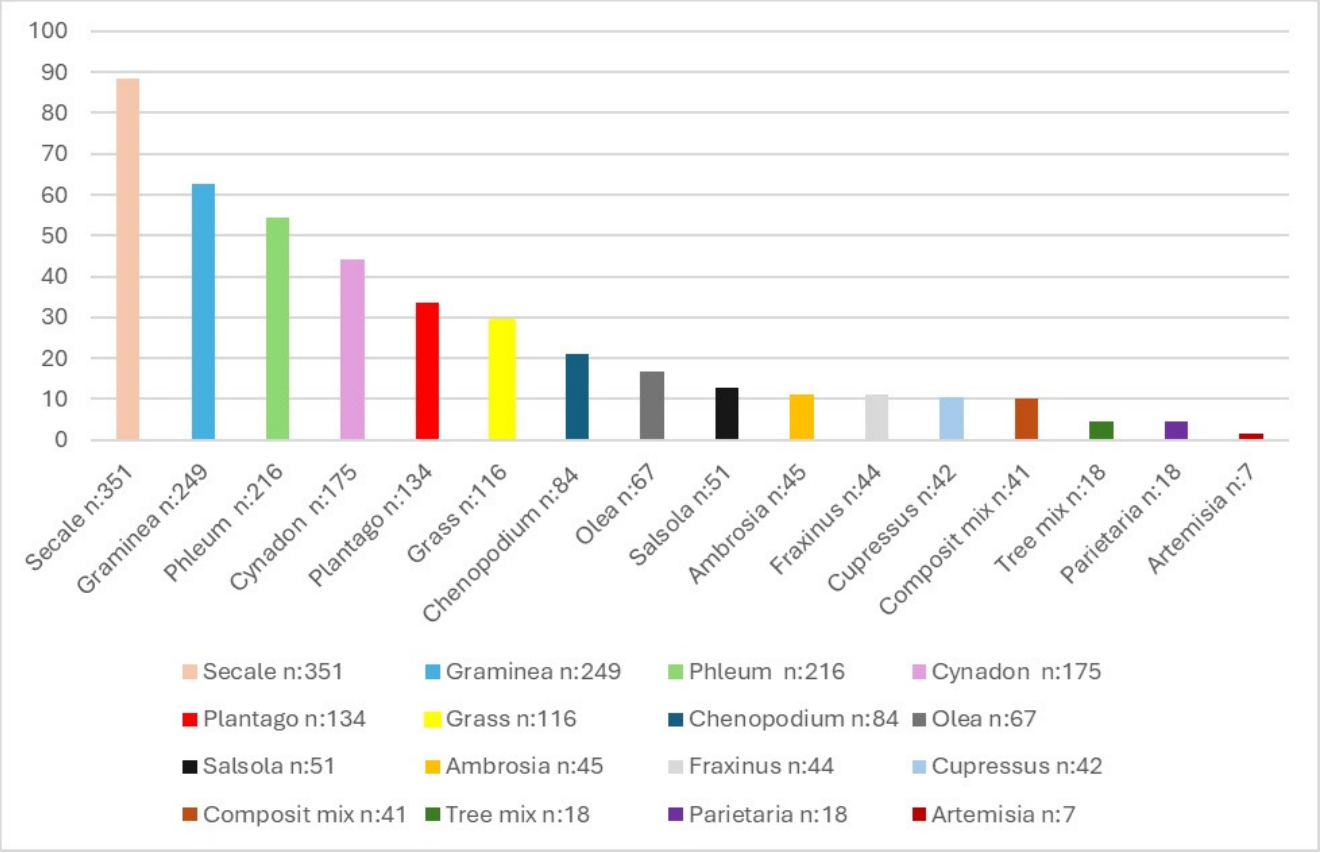

Figure 2 Pollen atopy distribution.

Table 2 Comparison of the clinical characteristics of patients with and without eosinophilia.

	Eosinophilia+ (n:245)	Eosinophilia- (n:236)	P
Age (month), (median (IQR))	132 (96-168)	156 (108-192)	**< 0.001**
Gender (male), n (%)	163 (81)	114 (38.2)	**< 0.001**
Allergic disease			
Allergic rhinitis, n (%)	221 (90)	180 (76.2)	**0.001**
Asthma, n (%)	106 (43.2)	76 (40.6)	0.705
Atopic dermatitis, n (%)	78 (28)	87 (36.8)	0.198
Family atopy, n (%)	159 (64.8)	160 (67.7)	0.361
Type of birth (CS), n (%)	97 (39.5)	86 (36.4)	0.500
Time of birth (preterm), n (%)	29 (11.8)	36 (15.2)	0.264
Polysensitized, n (%)	103 (42)	87 (36.8)	0.320

CS: Cesarean section; IQR: Interquartile range.

Table 3 Comparison of the clinical characteristics of patients with and without eosinophilia.

	Polysensitized (n:194)	Monosensitized (n:306)	P
Age (month), (median (IQR))	144 (108-192)	144 (96-180)	**0.045**
Gender (male), n (%)	115 (59.2)	170 (55.5)	0.937
Allergic disease			
Allergic rhinitis, n (%)	168 (86.5)	247 (80.7)	0.699
Asthma, n (%)	106 (54.6)	115 (37.5)	**0.050**
Atopic dermatitis, n (%)	69 (35.5)	101 (33)	0.899
Total IgE, (IU/mL) (median (IQR))	281 (104-610)	161.5 (56-452)	**<0.001**
EO (%), (median (IQR))	4 (2-6.25)	3.1 (2-7)	0.580
EO (/mm^3), (median (IQR))	300 (120-482)	240(117-462)	0.573
Family atopy, n (%)	136 (70.1)	193 (63)	0.471

EO: Eosinophil; IQR: Interquartile range.

Seasonal and monthly comparisons

When analyzing complaints by month, it was observed that no patients had monosensitization to Plantaginaceae, Urticaceae, Asteraceae, or tree pollens. The highest number of complaints was observed in patients with monosensitization to Poaceae, particularly in May, April, and June, which correspond to the spring and early summer months. Patients with monosensitization to Amaranthaceae reported complaints across different months, with slightly higher numbers in August and September, as illustrated in Figure 3.

This analysis reflects the distribution of complaints across different months for patients with monosensitization, without establishing direct causality between sensitization and reported symptoms.

Table 4 Comparison of the clinical characteristics of patients with house dust atopy only and pollen atopy only.

	House dust (n:90)	Pollen (n:300)	P
Age (month), (median (IQR))	132 (84-192)	144 (108-180)	0.195
Gender (male), n (%)	45 (50)	175 (58.3)	0.183
Allergic disease			
Allergic rhinitis, n (%)	57 (63.3)	264 (88)	**< 0.001**
Asthma, n (%)	38 (42.2)	93 (31)	0.057
Atopic dermatitis, n (%)	78 (86.6)	87 (29)	0.198
Family atopy, n (%)	52 (57.7)	202 (67.3)	0.102
Symptoms on admission			
Sneeze, n (%)	15 (16)	115 (38)	< 0.001
Shortness of breath, n (%)	29 (32)	73 (24)	0.171
Nasal congestion, n (%)	4 (4.4)	46 (15.3)	0.060
Skin rash, n (%)	23 (25.5)	39 (13)	**0.008**
Cough, n (%)	12 (13.3)	36 (12)	0.710
Eye discharge, n (%)	1 (1.1)	25 (8.3)	**0.014**
Eye redness, n (%)	0	21	-
Nasal itching, n (%)	1 (1.1)	21 (7)	-

IQR: Interquartile range.

Discussion

In our study, we evaluated children presenting to our allergy clinic diagnosed with aeroallergen sensitization using standardized SPT. Among the identified sensitizations, pollen was the most prevalent aeroallergen, and AR was the leading clinical presentation. An analysis of the monthly distribution of symptoms in these patients showed that pollen-related complaints were consistently common, with a notable peak in May.

During the study period, sensitization to at least one aeroallergen was detected in 24.7% of the children (n = 500/2017) who underwent SPT. Previous studies have reported a wide range of sensitization rates, varying from 29.3 to 66.1%.[11-15] These discrepancies are likely attributable to variations in climate, geography, and patient characteristics.

For instance, Guan et al.[11] reported a high sensitization rate of 66.1%, which may be related to elevated ambient aeroallergen levels and the warm and humid climate in their study region. In contrast, studies by Akcakaya et al.[12] and Sevgi et al.,[15] including only asthmatic patients, reported sensitization rates of 61 and 57%, respectively, likely reflecting the higher atopic burden in this specific population. A study by Cicek et al.,[14] conducted in a region with air quality and patient demographics comparable to those of our study, reported an aeroallergen sensitization rate of 29.31%, which was consistent with our findings. The predominant sensitizing aeroallergens vary across studies, depending on regional differences, methodologies, and study populations. House dust mites were previously reported as the most common aeroallergens in the Indian population.[16] In a recent study, mold was identified as the most prevalent aeroallergen in children under 4 years of age, whereas pollen was the leading aeroallergen in children above 4 years of age. Additionally, the same study

Table 5 Comparison of patients according to diagnosis.

	Asthma (n = 26)	AR (n = 260)	Both Asthma and AR (n = 156)	P
Gender (male), n (%)	15 (57.6)	140 (53.8)	96 (61.5)	0.307
Family atopy, n (%)	16 (61.5)	171 (65.7)	114 (73)	0.229
House dust mite atopy, n (%)	15 (57.6)	68 (26.1)	69 (44.2)	0.001
Pet dander atopy, n (%)	8 (30.7)	60 (23)	37 (23.7)	0.680
Mold atopy, n (%)	3 (11.5)	21 (8)	24 (15.3)	-
Pollen atopy, n (%)	17 (65.3)	223 (85.7)	122 (78.2)	0.012
Total IgE, (IU/mL) (median (IQR))	312 (78.7-1062)	198 (70-455)	264 (93-557)	0.131
Age (month), (median (IQR))	120 (105-192)	144 (108-192)	144 (96-180)	0.323
EO %, (median (IQR))	3 (1-6.25)	4 (2-7)	4 (1.9-7)	0.306
EO (/mm^3) (median (IQR))	210 (107.7-445)	290 (130-520)	280 (120-490)	0.646

AR: Allergic rhinitis; EO: Eosinophil; IQR: Interquartile range.

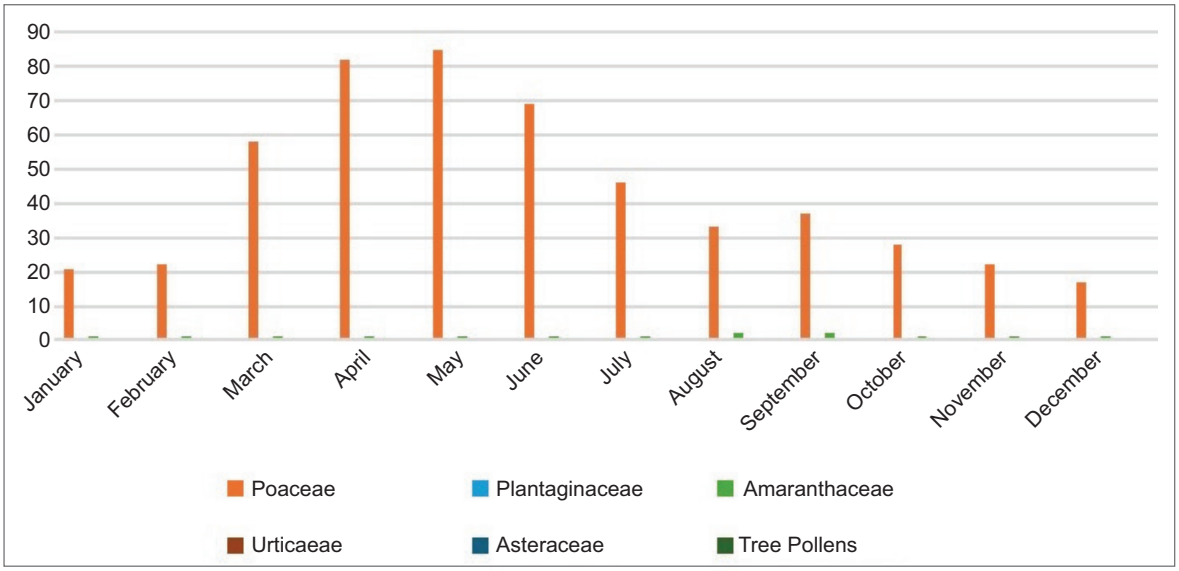

Figure 3 Monthly complaints of patients with monosensitization to pollen families (n = 214).

suggested that outdoor allergens become more dominant than indoor allergens after the age of 12 years.[17] In our study, pollens were the most frequently detected aeroallergens, followed by house dust mites and mold. The median age of our study population was 12 years, which may have influenced these findings. Similarly, a study conducted in Korea investigating 10-year trends in aeroallergen sensitization showed an increase in pollen sensitization rates over time, accompanied by a decrease in sensitization to house dust mites and molds.[18]

Environmental factors, such as air pollution and global warming, have been implicated in increasing pollen concentrations and associated sensitization rates,[19-21] which could also explain our results.

Moreover, humidity levels in our study region may have contributed to the observed patterns. Studies conducted in the same region have reported that mold spores are more frequently observed in high-humidity regions and less prevalent in drier regions such as Ankara, which has a continental climate and is distant from the sea.[22] This climate may favor pollen production while limiting the proliferation of house dust mites.[12,15]

The type of predominant aeroallergen may vary depending on specific atopic diseases, such as AR or asthma. Bian et al. reported that the sensitization rates for tree pollen, weed pollen, mold, animal dander, and dust mites were higher in patients with asthma than in those with AR.[17] Similarly, in our study, house dust mite sensitization was significantly more frequent in patients with asthma only, whereas pollen sensitization was more common in patients with AR only. In another study conducted among Chinese preschool children with AR, symptom scores were higher in children sensitized to pollen compared to those sensitized to mites or not sensitized to pollen. This study also highlighted that pollen sensitization was closely associated with nasal and conjunctival symptoms. Similarly, a study conducted in children with respiratory allergies reported that house dust mite allergy, a major indoor aeroallergen, was more common among patients with asthma, which is consistent with our findings.[23]

Another study involving children with respiratory allergies also found house dust mite sensitization to be significantly more common in patients with asthma, supporting our findings.[11]

Polysensitization, along with the high prevalence of monosensitization to aeroallergens, is a notable finding in our study and highlights the complexity of managing allergic diseases in children. In our study, 38.8% of patients (n = 194) were polysensitized. This rate is higher than the 17.6% reported by Kim et al.[18] in a 10-year study conducted in Korea, but lower than the 58.9% reported by Wang et al.[24] in a study from China. These variations in polysensitization prevalence may be attributed to regional differences, study populations, and methodological variations in the data collection.

A comparison of the months in which symptoms were reported revealed that pollen-related complaints were most frequent in May (31.8%), April (29.6%), and June (27%). Among the monosensitized patients, the Poaceae family was associated with the highest rate of complaints (98.1%, n = 156) (data not shown). In this family, Secale pollen was identified in a significant proportion of patients. These findings align with the seasonal distribution of aeroallergens in Ankara, where Poaceae pollens dominate during spring and early summer. Our study had several limitations. First, as a retrospective study, it relies on historical data, which may introduce certain biases; however, the large sample size enhances the reliability of our findings. Second, disease severity was not quantitatively assessed and correlated with the degree of sensitization. Future studies incorporating severity scores or symptom burden assessments may provide a more comprehensive understanding of clinical relevance. Lastly, although we documented symptom timing and sensitization patterns, we did

not establish a direct causal relationship between sensitization and reported symptoms. To minimize confounding factors in assessing causality between sensitization and symptoms, we excluded patients with cosensitization to nonpollen aeroallergens, such as house dust mites, molds, animal dander, and cockroaches. Our analysis focused solely on patients with pollen sensitization, and they were further categorized based on pollen families. Within this framework, we evaluated symptom timing in patients with monosensitization to a single pollen family to establish a clear association between pollen exposure and symptom onset. Although this approach cannot definitively establish causality, it provides a more focused perspective on the potential relationship between pollen sensitization and reported symptoms.

In conclusion, pollen was found to be the most common aeroallergen in this large patient population study in Ankara, located in the Central Anatolia region. The Poaceae family contains the most common pollen. It is essential to include at least one pollen group, such as secale from the Poaceae family, in the skin test panel for the Central Anatolia region, to ensure accurate allergen detection. Identifying the most prevalent region-specific allergens is crucial for cost-effective and appropriate public health interventions.

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Informed Consent

Informed consent was obtained.

Author's Contributions

All authors contributed equally.

Conflicts of Interest

None.

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References

1. Haahtela T, von Hertzen L, Mäkelä M, Hannuksela M. Finnish Allergy Programme 2008–2018—Time to act and change the course. Allergy. 2008;63(6):634–45. https://doi.org/10.1111/j.1398-9995.2008.01712.x
2. Wahn U, Lau S, Bergmann R, Kulig M, Forster J, Bergmann K, et al. Indoor allergen exposure is a risk factor for sensitization during the first three years of life. J Allergy Clin Immunol. 1997;99(6 Pt 1):763–9. https://doi.org/10.1016/s0091-6749(97)80009-7
3. Li J, Wang H, Chen Y, Zheng J, Wong GW, Zhong N. House dust mite sensitization is the main risk factor for the increase in prevalence of wheeze in 13- to 14-year-old schoolchildren in Guangzhou city, China. Clin Exp Allergy. 2013;43(10):1171–9. https://doi.org/10.1111/cea.12157
4. Dickel H, Kuhlmann L, Bauer A, Bircher AJ, Breuer K, Fuchs T, et al. Atopy patch testing with aeroallergens in a large clinical population of dermatitis patients in Germany and Switzerland, 2000-2015: A retrospective multicentre study. J Eur Acad Dermatol Venereol. 2020;34(9):2086–95. https://doi.org/10.1111/jdv.16250
5. Gureczny T, Heindl B, Klug L, Wantke F, Hemmer W, Wöhrl S. Allergy screening with extract-based skin prick tests demonstrates higher sensitivity over in vitro molecular allergy testing. Clin Transl Allergy. 2023;13(2):e12220. https://doi.org/10.1002/clt2.12220
6. Oezguen N, Rider NL, Dowlin M, Singh I. Identifying region-specific allergy sensitization clusters to optimize diagnosis and reduce costs. J Pediatr. 2024;270:113999.
7. Dramburg S, Hilger C, Santos AF, de Las Vecillas L, Aalberse RC, Acevedo N, et al. EAACI Molecular Allergology User's Guide 2.0. Pediatr Allergy Immunol. 2023;34 Suppl 28:e13854. https://doi.org/10.1111/pai.13854
8. Shetty NS, Lunge S, Sardesai VR, Dalal AB. A cross-sectional study comparing application of Hanifin and Rajka criteria in Indian pediatric atopic dermatitis patients to that of other countries. Indian Dermatol Online J. 2022;14(1):32–7. https://doi.org/10.4103/idoj.idoj_192_22
9. 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. https://doi.org/10.1016/j.jaci.2010.06.047
10. Levy ML, Bacharier LB, Bateman E, Boulet LP, Brightling C, Buhl R, et al. Key recommendations for primary care from the 2022 Global Initiative for Asthma (GINA) update. NPJ Prim Care Respir Med. 2023;33(1):7. https://doi.org/10.1038/s41533-023-00330-1
11. Guan K, Zhu W, Sha L, Liu C, Zhao J, Yin J, et al. Prevalence of sensitization to aeroallergens in greater Beijing region children with respiratory allergy. Front Pediatr. 2022;10:848357. https://doi.org/10.3389/fped.2022.848357
12. Akcakaya N, Cokugras H, Camcioglu Y, Ozdemir M. Skin test hypersensitivity for childhood asthma in Istanbul during a period of 16 years. Allergol Immunopathol (Madr). 2005;33(1):15–9. https://doi.org/10.1157/13070603
13. Ayçin GD, Bayrak M, Çadırcı K. Alerjik rinit ve astım olan hastalarda prick testi sonuçlarımız. J Health Sci Med. 2020; 3(3):245–9. https://doi.org/10.32322/jhsm.710017
14. Çiçek D, Kandi B, Bakar S, Ucak H. Elazığ yöresinde allerjik astma, allerjik rinit, allerjik konjunktivit, kronik ürtiker ve atopik dermatitli olgularda prick test sonuçlarının değerlendirilmesi. Fırat Üniversitesi Sağlık Bilimleri Tıp Dergisi. 2008; 22(4):193–6.
15. Sevgi SÇ, Gizem A. Aeroallergen distributions in skin prick tests in children with asthma and allergic rhinitis living in the Elazığ and Malatya regions. J Child. 2023; 23(1):35–41. https://doi.org/10.26650/jchild.2023.1152191
16. Dey D, Mondal P, Laha A, Sarkar T, Moitra S, Bhattacharyya S, et al. Sensitization to common aeroallergens in the atopic population of West Bengal, India: An investigation by skin prick test. Int Arch Allergy Immunol. 2019; 178(1):60–5. https://doi.org/10.1159/000492584

17. Bian S, Zhu W, Guan K, Sha L. Prevalence of aeroallergen sensitization in children in Northern China. J Asthma. 2024; 61(9):1021–8. https://doi.org/10.1080/02770903.2024.2320783
18. Kim YJ, Lee MY, Yang AR, Sol IS, Kwak JH, Jung HL, et al. Trends of sensitization to inhalant allergens in Korean children over the last 10 years. Yonsei Med J. 2020;61(9):797–804. https://doi.org/10.3349/ymj.2020.61.9.797
19. Kim JH, Oh JW, Lee HB, Kim SW, Kang IJ, Kook MH, et al. Changes in sensitization rate to weed allergens in children with increased weeds pollen counts in Seoul metropolitan area. J Korean Med Sci. 2012;27(4):350–5. https://doi.org/10.3346/jkms.2012.27.4.350
20. Choi SW, Lee J-H, Kim Y, Oh I-B, Choi K-R. Association between the sensitization rate for inhalant allergens in patients with respiratory allergies and the pollen concentration in Ulsan, Korea. Korean J Med. 201;86(4):453–61. https://doi.org/10.3904/kjm.2014.86.4.453
21. Yoon BJ, Kim SH, Kim DH, Koh YI. Longitudinal changes of sensitization rates to inhalant allergens in patients with allergic diseases from Gwangju and Chonnam areas: their association with annual changes in temperature. Korean J Asthma Allergy Clin Immunol. 2011;31(2):93.
22. Harmancı K, Bakırtaş A, Türktaş İJTRJ. Sensitization to aeroallergens in preschool children with respiratory problems in Ankara, Turkey. Turk Thorac J. 2006;7(1):10–4.
23. Huang Z, Li A, Zhu H, Pan J, Xiao J, Wu J, et al. Multicenter study of seasonal and regional airborne allergens in Chinese preschoolers with allergic rhinitis. Sci Rep. 2024;14(1):4754.
24. Wang W, Zhang XH, Zhu L, Liu YX. Investigation of allergic sensitization pattern in 4,203 children in Northern China. Int Arch Allergy Immunol. 2021;182(5):455–8. https://doi.org/10.1159/000511976