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Sensitization to Dermatophagoid Mites and Animal Dander In Patients With Allergic Rhinitis: An Evaluation Based On Skin Prick Test Findings

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ABSTRACT

Background: Allergic rhinitis is one of the most frequently encountered allergic conditions, and the types of sensitizing aeroallergens can vary significantly by region. Therefore, having region-specific data on allergen sensitization is important in guiding both the diagnosis and treatment. This study aimed to identify the most common aeroallergens among adult patients with allergic rhinitis and to evaluate sensitization particularly to dermatophagoid mites and pet dander.

Materials and Methods: In this retrospective cohort study, data from 179 patients who presented with allergic rhinitis symptoms between October 2023 and October 2024 were reviewed. Sensitization to aeroallergens was assessed through skin prick testing. Total IgE levels, eosinophil counts, asthma status, and history of pet ownership were also analyzed.

Results: Sensitization to Dermatophagoides pteronyssinus and D. farinae was observed in 63.1% and 61.5% of the patients, respectively. Among individuals with pets, sensitization to cat dander (24.2% vs. 7.5%, p=0.010) and dog dander (12.1% vs. 2.7%, p=0.039) was significantly more common. Patients sensitized to D. pteronyssinus, D. farinae, and cat dander had significantly higher total IgE levels (p=0.001, p=0.010, and p=0.003, respectively). In addition, eosinophil counts were higher in those sensitized to cat (p=0.037) and dog (p=0.017) dander.

Conclusion: Dermatophagoid mites appear to be the most common aeroallergens among patients with allergic rhinitis. Sensitization to pet dander is associated with elevated total IgE and eosinophil levels. These findings should be considered when offering personalized prevention strategies and planning immunotherapy.

Keywords: Allergic rhinitis, skin prick test, aeroallergen sensitization, house dust mites, total IgE, eosinophils

INTRODUCTION

Allergic rhinitis (AR) is a common upper respiratory tract disease characterized by type I hypersensitivity reactions mediated by immunoglobulin E (IgE) in response to environmental aeroallergens. Substances that are typically considered harmless such as pollen, house dust mites, animal dander, or mold can trigger symptoms like nasal discharge, congestion, sneezing, and itching in affected individuals (1,2). AR affects hundreds of millions globally, with prevalence and sensitization patterns influenced by geographic and environmental factors (3,4). In Türkiye, studies suggest that the prevalence of AR among adults ranges from 15% to 25%, with higher rates reported in metropolitan areas compared to smaller cities (5,6).

AR not only manifests with physical symptoms but also significantly impacts the quality of life, leading to sleep disturbances, poor concentration, social withdrawal, and loss of productivity. Consequently, the ARIA (Allergic Rhinitis and its Impact on Asthma) guideline, supported by the World Health Organization, identifies AR as a major public health concern (7,8). Effective management of the disease requires an understanding of regional allergen exposure and sensitization patterns. Sensitization to aeroallergens can vary depending on the local climate, environ-

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mental conditions, lifestyle habits, and genetic predisposition. Moreover, total IgE and eosinophil levels have been increasingly used as objective markers of allergic disease severity and immunological activity. Their associations with specific allergen sensitizations, particularly perennial allergens like dust mites and animal dander, offer important clinical insights. Given the known regional variations in allergen prevalence, understanding these immunological relationships in underrepresented areas is essential for developing targeted treatment strategies. Identifying specific allergens involved in AR can aid the development of region-specific maps and more personalized treatment.

The skin prick test (SPT) is an effective and widely used method to detect specific IgE responses, serving both diagnostic purposes and regional allergen profiling (5). Although aeroallergen sensitization has been studied in various regions of Türkiye, the Black Sea region characterized by its humid climate and rich vegetation remains relatively understudied (5,9). Moreover, most studies assess asthma comorbidity, pet exposure, and immunological parameters separately and few have comprehensively evaluated these variables together. An integrated analysis of these factors could provide a more holistic understanding of how environmental exposures influence the immune system (10). Regional variation in allergen prevalence is a critical determinant of sensitization patterns. Additionally, immune markers such as total IgE and eosinophil counts have been shown to correlate with aeroallergen sensitization, particularly to perennial allergens like dust mites and pet dander. Evaluating these associations can enhance diagnostic precision and inform individualized treatment strategies.

Accordingly, this study aimed to answer the following research questions:

1. What is the distribution of aeroallergens detected in patients with allergic rhinitis? (Research Question - RQ1)
2. Is there an association between the presence of asthma and sensitization to specific aeroallergens? (RQ2)
3. Is pet ownership associated with the presence of allergen sensitization? (RQ3)
4. Is sensitization to specific aeroallergens significantly associated with total IgE and eosinophil levels? (RQ4)

The primary objective of this study was to determine the aeroallergen sensitization profiles of adult patients with allergic rhinitis using the skin prick test, and to evaluate the association of sensitization to house dust mites and animal dander with asthma comorbidity, pet exposure, and immunological parameters (total IgE and eosinophil levels).

MATERIALS and METHODS

Study Design

This retrospective cohort study was conducted at the Immunology and Allergy Diseases Outpatient Clinic of Samsun Training and Research Hospital between October 2023 and October 2024.

Study Population

The study included adult patients over the age of 18 who were evaluated due to allergic rhinitis symptoms (nasal discharge, congestion, itching, and sneezing) and had at least one positive response to an inhalant aeroallergen on the skin prick test. The diagnosis of allergic rhinitis was established based on clinical evaluation and SPT results.

Inclusion Criteria:

- Age over 18 years
- Presence of allergic rhinitis symptoms
- Sensitization to at least one inhalant allergen confirmed by SPT

Exclusion Criteria:

- No allergen sensitization detected on SPT
- Patients with a previously positive SPT result from another center but negative results in our clinic
- Missing clinical or laboratory data

Ethical Approval

This study was approved by the Non-Interventional Clinical Research Ethics Committee of Samsun University (Approval Date:19.03.2025, Approval Number: GOKAEK 2025/6/17). All procedures were carried out in accordance with the principles of Good Clinical Practice (GCP) and the Declaration of Helsinki (2013 revision). Patient identities were anonymized, and data protection regulations were strictly observed.

Measurements and Data Collection

Demographic and clinical data including age, sex, presence of asthma, and pet ownership status were obtained from hospital medical records. Laboratory parameters such as total IgE and eosinophil counts were retrieved from electronic medical records. Skin prick tests were performed by experienced nurses at the allergy clinic in accordance with standard protocols. Allergen extracts used in the test were selected based on regional prevalence and national allergy guidelines.

Skin Prick Test Protocol

The test panel included 19 allergens: Dermatophagoides farinae, Dermatophagoides pteronyssinus, grass mix, tree mix, Olea europaea, Corylus avellana, ragweed, cupressus, Betula verrucosa, Alternaria alternata, aspergillus mix, cat dander, dog dander, Chenopodium album, Artemisia vulgaris, Plantago lanceolata, Perietaria judaica, Platanus acerifolia, and Aspergillus fumigatus.

Physiological saline was used as a negative control, and histamine as a positive control. Wheal diameters were measured 15-20 minutes after application; a result was considered positive if the wheal diameter exceeded the negative control by 3 mm or more. SPT was performed on patients with allergic rhinitis and/or asthma symptoms who had not taken antihistamines for at least 7 days.

Statistical Analysis

A priori sample size estimation was performed using PASS 11 software to determine the minimum required number of patients for estimating the prevalence of allergic sensitization in a single group with sufficient precision. Assuming a sensitization rate of 58% based on a previous study conducted in Türkiye (5), a sample size of 178 patients would be required to estimate the prevalence with a 95% confidence interval and a ±15% margin of error. Our final sample of 179 patients was deemed sufficient for this purpose.

All statistical analyses were performed using IBM SPSS Statistics version 25.0 (IBM Corp., Armonk, NY, USA). Normality of distribution for quantitative variables was assessed using the Kolmogorov–Smirnov test. Descriptive statistics were presented as median (interquartile range) for non-normally distributed continuous variables and as frequency (percentage) for categorical variables. Associations between categorical variables were analyzed using the Chi-square or Fisher's exact test. Non-normally distributed continuous variables were compared using the Mann–Whitney U test. A p-value < 0.05 was considered statistically significant.

RESULTS

A total of 179 patients diagnosed with allergic rhinitis were included in the study, comprising 58 males and 121 females. The median age was 32 years (interquartile range: 24–43; range: 18–77 years). Among them, 28 patients (15.64%) had concomitant asthma, and 33 patients (18.44%) reported having a pet at home. The most commonly detected allergens in the skin prick test were Dermatophagoides pteronyssinus (63.13%), Dermatophagoides farinae (61.45%), and cupressus pollen (31.28%) (Table I).

Table I. Descriptive Statistics of Variables

Age	32 (24 - 43)
Gender	
Male	58 (32.40)
Female	121 (67.60)
Total IgE	159 (58 - 342)
Eosinophil	200 (120 - 340)
Allergic rhinitis	179 (100.00)
Asthma	28 (15.64)
Presence of a pet at home	33 (18.44)
Cat	17 (9.50)
Dog	4 (2.23)
Bird	12 (6.70)
Skin Prick Test Positivity	
Dermatophagoides farinae	110 (61.45)
Dermatophagoides pteronyssinus	113 (63.13)
Grass, mix	46 (25.70)
Tree, mix	15 (8.38)
Olea europaea	28 (15.64)
Corylus avellana	23 (12.85)
Ragweed	32 (17.88)
Cupressus	56 (31.28)
Betula verrucosa	16 (8.94)
Alternaria alternata	2 (1.12)
Aspergillus, mix	0 (0.00)
Cat dander	19 (10.61)
Dog dander	8 (4.47)
Chenopodium album	11 (6.15)
Artemisia vulgaris	17 (9.50)
Plantago lanceolata	19 (10.61)
Parietaria judaica	6 (3.35)
Platanus acerifolia	4 (2.23)
Aspergillus fumigatus	1 (0.56)

Descriptive statistics are presented as median (1st quartile – 3rd quartile) for quantitative variables not assuming normal distribution, and as frequency (percentage) for quantitative variables.

Table II. Distribution of Skin Prick Test Positivity According to Asthma Status

	Asthma		
	Present (n=28)	Absent (n=151)	p-value
Dermatophagoides farinae	19 (67.86)	91 (60.26)	0,585†
Dermatophagoides pteronyssinus	20 (71.43)	93 (61.59)	0,437†
Grass, mix	7 (25.00)	39 (25.83)	1,000†
Tree, mix	3 (10.71)	12 (7.95)	0,708‡
Olea auropa	1 (3.57)	27 (17.88)	0,085‡
Corylus avellana	3 (10.71)	20 (13.25)	1,000‡
Ragweed	3 (10.71)	29 (19.21)	0,419†
Cupressus	11 (39.29)	45 (29.80)	0,440†
Betula verrucosa	5 (17.86)	11 (7.28)	0,139‡
Alternaria alternata	0 (0.00)	2 (1.32)	1,000‡
Aspergillus, mix	0 (0.00)	0 (0.00)	N/A
Cat dander	5 (17.86)	14 (9.27)	0,186‡
Dog dander	1 (3.57)	7 (4.64)	1,000‡
Chenopodium album	2 (7.14)	9 (5.96)	0,683‡
Artemisia vulgaris	3 (10.71)	14 (9.27)	0,733‡
Plantago lanceolata	3 (10.71)	16 (10.60)	1,000‡
Perietaria judaica	2 (7.14)	4 (2.65)	0,237‡
Platanus acerifolia	3 (10.71)	1 (0.66)	0,012‡
Aspergillus fumigatus	0 (0.00)	1 (0.66)	1,000‡

Descriptive statistics are given as frequency (percentage). † Chi-square test, ‡ Fisher's exact test, N/A Not Applicable. Statistically significant p-values are shown in bold font.

Among patients with asthma, sensitization to Platanus acerifolia pollen was significantly more common than in patients without asthma (p=0.012). No statistically significant differences were observed between asthma and non-asthma groups regarding sensitization to other allergens. Table II summarizes the distribution of allergen sensitization among patients with and without asthma.

Patients with pets at home showed significantly higher sensitization rates to cat dander (p=0.010) and dog dander (p=0.039) compared to those without pets. No other allergens showed significant differences between the groups with and without pet ownership. Table III presents the comparison of skin prick test positivity according to pet ownership status.

Patients sensitized to Dermatophagoides farinae (p=0.010), Dermatophagoides pteronyssinus (p=0.001), and cat dander (p=0.003) had significantly higher total IgE levels compared to non-sensitized individuals. In addition, eosinophil levels were significantly higher in those sensitized to cat dander (p=0.037) and dog dander (p=0.017). Table IV shows the distribution of total IgE and eosinophil levels according to specific allergen sensitizations.

DISCUSSION

Allergic rhinitis is a prevalent chronic respiratory condition that significantly affects the quality of life worldwide. Although clinical management is largely influenced by aeroallergen sensitization, the predominant allergens vary substantially depending on environmental and climatic factors. This study aimed to define the local distribution of aeroallergens in Samsun city, Türkiye, and to investigate the associated clinical and immunological findings, thereby contributing regional data to the existing literature. Our findings indicate that house dust mites (D. pteronyssinus and D. farinae) are the most common sensitizing agents, while individuals who owned pets showed significantly higher sensitization to cat and dog dander,

Table III. Distribution of Skin Prick Test Positivity According to Presence of Pets at Home

	Pet at home		
	Present (n=33)	Absent (n=146)	p-value
Dermatophagoides farinae	22 (66.67)	88 (60.27)	0.629†
Dermatophagoides pteronyssinus	23 (69.70)	90 (61.64)	0.505†
Grass, mix	10 (30.30)	36 (24.66)	0.653†
Tree, mix	3 (9.09)	12 (8.22)	1.000‡
Olea europaea	2 (6.06)	26 (17.81)	0.158†
Corylus avellana	3 (9.09)	20 (13.70)	0.577‡
Ragweed	3 (9.09)	29 (19.86)	0.227†
Cupressus	8 (24.24)	48 (32.88)	0.448†
Betula verrucosa	2 (6.06)	14 (9.59)	0.740‡
Alternaria alternata	0 (0.00)	2 (1.37)	1.000‡
Aspergillus, mix	0 (0.00)	0 (0.00)	N/A
Cat dander	8 (24.24)	11 (7.53)	**0.010**‡
Dog dander	4 (12.12)	4 (2.74)	**0.039**‡
Chenopodium album	1 (3.03)	10 (6.85)	0.692‡
Artemisia vulgaris	2 (6.06)	15 (10.27)	0.742‡
Plantago lanceolata	1 (3.03)	18 (12.33)	0.206‡
Parietaria judaica	1 (3.03)	5 (3.42)	1.000‡
Platanus acerifolia	0 (0.00)	4 (2.74)	1.000‡
Aspergillus fumigatus	0 (0.00)	1 (0.68)	1.000‡

Descriptive statistics are given as frequency (percentage). † Chi-square test, ‡Fisher's exact test, N/A Not Applicable. Statistically significant p-values are shown in bold font.

Table IV. Total IgE and Eosinophil Levels According to Skin Prick Test Results

	Total IgE	p-value	Eosinophil	p-value
Dermatophagoides farinae				
Positive	182.5 (74-406)	**0.010**	200 (130-340)	0.401
Negative	122 (46-245)		200 (110-330)	
Dermatophagoides pteronyssinus				
Positive	186 (101-448)	**0.001**	200 (130-350)	0.207
Negative	109 (44-229)		200 (110-310)	
Grass, mix				
Positive	196.5 (82-413)	0.330	210 (130-340)	0.836
Negative	153 (58-326)		200 (120-340)	
Tree, mix				
Positive	132 (57-407)	0.805	200 (70-310)	0.337
Negative	163 (59-340)		200 (120-340)	
Olea europaea				
Positive	176.5 (52-361.5)	0.696	200 (120-310)	0.306
Negative	159 (63-342)		200 (120-340)	

Table IV. Continue

	Total IgE	p-value	Eosinophil	p-value
Corylus avellana				
Positive	181 (57-407)	0.885	200 (110-260)	0.262
Negative	156.5 (59-340)		200 (120-340)	
Ragweed				
Positive	145 (62.5-281.5)	0.441	230 (135-330)	0.687
Negative	168 (58-385)		200 (120-340)	
Cupressus				
Positive	135 (50.5-286)	0.163	200 (130-320)	0.988
Negative	169 (64-407)		210 (110-340)	
Betula verrucosa				
Positive	100 (57-402.5)	0.714	181 (95-335)	0.521
Negative	167 (60-342)		200 (120-340)	
Alternaria alternata				
Positive	92.5 (60-125)	0.442	125 (40-210)	0.303
Negative	167 (58-342)		200 (120-340)	
Aspergillus, mix				
Positive	-	N/A	-	N/A
Negative	159 (58-342)		200 (120-340)	
Cat dander				
Positive	277 (171-644)	**0.003**	330 (160-510)	**0.037**
Negative	135 (55.5-330.5)		200 (120-330)	
Dog dander				
Positive	240 (147-753)	0.113	455 (190-520)	**0.017**
Negative	155 (57-338)		200 (120-330)	
Chenopodium album				
Positive	198 (79-554)	0.714	310 (200-410)	0.115
Negative	158.5 (57.5-340)		200 (120-335)	
Artemis vulgaris				
Positive	167 (90-407)	0.773	230 (150-330)	0.483
Negative	158.5 (57-338)		200 (120-340)	
Plantago lanceolata				
Positive	129 (57-496)	0.777	210 (140-400)	0.629
Negative	167.5 (60.5-334.5)		200 (120-335)	
Parietaria judaica				
Positive	240 (112-554)	0.303	295 (200-410)	0.332
Negative	158 (57-338)		200 (120-340)	
Platanus acerifolia				
Positive	68 (57-343.5)	0.552	270 (85-405)	0.957
Negative	167 (60-342)		200 (120-340)	
Aspergillus fumigatus				
Positive	181 (181-181)	0.877	260 (260-260)	0.677
Negative	158.5 (58-342)		200 (120-340)	

Descriptive statistics for non-normally distributed quantitative variables are given as median (1st quartile - 3rd quartile). p-values are obtained by the Mann-Whitney U test. N/A Not Applicable. Statistically significant p-values are shown in bold font.

along with elevated total IgE and eosinophil levels. In patients with asthma, sensitization to certain pollens and particularly Platanus acerifolia was more prevalent.

Regional Aeroallergen Profile (RQ1)

The dominant aeroallergens in allergic rhinitis vary according to the regional climate, geographic features, and daily life habits. House dust mites (D. pteronyssinus, D. farinae), pollens, and animal dander are the most frequently reported sensitizing agents in the literature (11). In our study, D. pteronyssinus (63.1%) and D. farinae (61.4%) were the most common allergens in Samsun city, followed by cupressus pollen (31.3%). Similar findings were reported in a large-scale study from Guangzhou, China a region with a humid subtropical climate highlighting the role of humidity and indoor allergen exposure in sensitization (12).

Studies from other regions in Türkiye reveal variation in allergen patterns based on local environmental conditions. In drier, high-altitude regions like Erzurum and Van, pollen sensitization is more prominent, whereas in humid regions such as Samsun city, dust mite sensitization prevails (13–15).

International epidemiological data support this trend as well: pollen sensitization is more common in rural areas of Europe and North America, whereas sensitization to indoor allergens such as mites and molds increases with urbanization (16). The high dust mite sensitization rate in our study may be attributed to Samsun city's humid climate and increased time spent indoors. The high rate of sensitization to cupressus pollen (>30%) also reflects the local vegetation of the Black Sea region, which may be underrepresented in broader-scale studies (17).

Overall, our findings are consistent with those reported from other humid regions in Türkiye and similar climates worldwide. The contrasting results observed in arid areas dominated by pollen sensitization emphasize the importance of evaluating allergen sensitization at both national and local levels.

Association Between Asthma and Allergen Sensitization (RQ2)

The close relationship between allergic rhinitis and asthma is well-established and is often explained by the "one airway, one disease" concept (2). The prevalence of asthma among individuals with allergic rhinitis ranges from 10% to 40%, with higher risk observed in those sensitized to indoor allergens such as house dust mites and Alternaria alternata (18). Sensitization to aeroallergens is therefore considered not only an environmental risk factor but also a potential biomarker for asthma development.

In our study, 15.6% of patients had comorbid asthma. Among these, 71.4% were sensitized to D. pteronyssinus and 67.9% to D. farinae, though these differences were not statistically significant compared to non-asthmatic individuals. However, sensitization to Platanus acerifolia pollen was significantly more common in asthmatic patients (10.7%, p=0.012), suggesting a potential role of regional pollen exposure in asthma development.

International studies have demonstrated a strong link between dust mite sensitization and asthma, particularly in humid regions (19,20). Additionally, European multicenter studies have found that pollen sensitization may also contribute to asthma risk, with variations based on age, duration of exposure, and genetic predisposition (21).

Although our study did not find a statistically significant association between asthma and dust mite sensitization, the rates were nonetheless higher among asthmatic patients. The significant association with Platanus acerifolia sensitization supports the inclusion of local pollen profiles in clinical decision-making.

Pet Ownership and Sensitization (RQ3)

Sensitization to animal dander is known to be influenced by direct and prolonged exposure. Several European cohort studies have shown that early-life exposure to cats may increase allergic sensitization, whereas dog exposure may have a protective effect against asthma development (22). In our study, the sensitization rates to cat and dog dander were 10.6% and 4.5%, respectively. Among individuals with pets, these rates increased to 24.2% (cat) and 12.1% (dog), compared to 7.5% and 2.7% in those without pets. These differences were statistically significant (p=0.010 and p=0.039), supporting the idea that direct pet contact increases the risk of sensitization.

Similarly, a study from eastern Türkiye found that individuals sensitized to cat epithelium had significantly higher total IgE and eosinophil counts (13). However, other studies suggest that early-life exposure to pets may promote immune tolerance and reduce allergic disease risk later in life (23). This protective effect, particularly with dog ownership, has been attributed to increased microbial diversity (24,25). Conversely, a meta-analysis by Pinot de Moira et al. involving over 77,000 children found that pet ownership did not directly increase asthma or the sensitization risk but could exacerbate symptoms in already sensitized individuals (22). These variations may be due to differences in exposure duration, intensity, genetic predisposition, and environmental context.

Our findings support the general consensus that pet ownership is associated with higher sensitization to cat and dog dander. However, conflicting results regarding early-life exposure underscore the need for future studies that evaluate age-specific sensitization patterns more comprehensively.

Immunological Parameters and Sensitization (RQ4)

Total IgE and eosinophil counts are two commonly used immunological markers in the diagnosis and monitoring of allergic diseases. Elevated levels are especially common in individuals sensitized to perennial aeroallergens such as dust mites and animal dander (26). In our study, patients sensitized to D. pteronyssinus and D. farinae had significantly higher median total IgE levels (186 IU/mL and 182.5 IU/mL, respectively; p=0.001 and p=0.010). These findings suggest that chronic exposure to dust mites elicits a more pronounced immune response.

Although eosinophil counts were not significantly associated with dust mite sensitization, they were elevated in patients sensitized to cat (330 cells/µL, p=0.037) and dog dander (455 cells/µL, p=0.017), indicating that exposure to animal allergens may provoke a stronger eosinophilic response. Similar findings have been reported in the literature, with both total IgE and eosinophil levels increasing in patients sensitized to cat allergens, often correlating with symptom severity (27).

Conversely, individuals sensitized to pollens had relatively lower total IgE and eosinophil levels. For example, median total IgE was 196.5 IU/mL in grass pollen-positive patients and 132 IU/mL in those sensitized to tree pollen. This may reflect the more limited immune activation associated with seasonal allergens compared to year round exposure (8).

Other studies suggest that immune responses vary not only by allergen type but also by individual characteristics and exposure duration. The NHANES study by Salo et al. in the United States found that total IgE levels were significantly elevated only for certain allergen groups, with weaker associations in others (28). Furthermore, high IgE levels and severe symptoms have been observed in some individuals sensitized to pollens, indicating that immune responses are shaped by both allergen properties and personal susceptibility.

In summary, our findings indicate that total IgE levels are elevated primarily in individuals sensitized to perennial allergens such as dust mites and pet dander, while eosinophil counts are more strongly associated with animal allergens. These results highlight the importance of considering allergen-specific immune profiles in clinical management.

This study has several limitations that should be acknowledged. First, the sample size of 179 patients, while adequate for exploratory analysis of sensitization patterns, may be insufficient for definitive prevalence estimates in the broader population. Future studies with larger, population-based samples and formal power calculations would strengthen these findings.

CONCLUSION

Although the allergens evaluated have been studied elsewhere, the current analysis uniquely integrates aeroallergen sensitization with pet ownership, asthma status, and immunological parameters in a humid region of Türkiye that is underrepresented in the existing literature. Our findings demonstrate that house dust mites (Dermatophagoides pteronyssinus and D. farinae) are the predominant sensitizing agents, likely due to the humid climate of the region. In addition, pet ownership was significantly associated with increased sensitization to cat and dog dander, accompanied by higher total IgE and eosinophil levels in affected individuals. Among patients with asthma, sensitization to specific pollens and particularly Platanus acerifolia was more pronounced, suggesting a role of local environmental factors in asthma development.

Immunological assessment revealed that sensitization to perennial allergens was associated with higher total IgE levels, while eosinophil counts were more closely linked to animal dander. These findings suggest that allergen-specific immune response patterns should be considered in clinical decision-making and patient management.

In line with the findings obtained; it is recommended to consider region-specific aeroallergen profiles in the diagnosis and treatment of allergic rhinitis, to personalize protection strategies, and to emphasize perennial allergen sensitivity in immunotherapy planning. In addition, a holistic evaluation of aeroallergen sensitivity not only with test results but also with concomitant diseases and immunological markers will enable more effective patient management.

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None.

Conflict of Interest

The authors declare that they have no conflict of interest.

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Author Contributions

The author designed the study, collected and analyzed data, and wrote the manuscript.

REFERENCES

1. Greiner AN, Hellings PW, Rotiroti G, Scadding GK. Allergic rhinitis. Lancet 2011;378(9809):2112-22.
2. Bousquet J, Khaltaev N, Cruz AA, Denburg J, Fokkens WJ, Togias A, et al. Allergic Rhinitis and its Impact on Asthma (ARIA) 2008 update (in collaboration with the World Health Organization, GA(2)LEN and AllerGen). Allergy 2008;63 Suppl 86:8-160.
3. Nur Husna SM, Tan HT, Md Shukri N, Mohd Ashari NS, Wong KK. Allergic Rhinitis: A Clinical and Pathophysiological Overview. Front Med (Lausanne) 2022;9:874114.
4. Savouré M, Bousquet J, Jaakkola JJK, Jaakkola MS, Jacquemin B, Nadif R. Worldwide prevalence of rhinitis in adults: A review of definitions and temporal evolution. Clin Transl Allergy 2022;12(3):e12130.
5. Ediger D, Günaydin FE, Erbay M, Şeker Ü. Trends of sensitization to aeroallergens in patients with allergic rhinitis and asthma in the city of Bursa, South Marmara Sea Region of Turkey. Turk J Med Sci 2020;50(2):330-6.
6. Erbay M. The distribution of sensitization to common aeroallergens in patients with rhinitis and asthma in Şanlıurfa, Türkiye. Tuberk Toraks 2023;71(3):281-9.
7. Yorgancıoğlu A, Gemicioğlu B, Cingi C, Kalayci O, Kalyoncu A, Bachert C, et al. 2019 ARIA Care pathways for allergic rhinitis-Turkey. Turkish Thoracic Journal 2020;21(2):122-33.
8. Eifan AO, Durham SR. Pathogenesis of rhinitis. Clin Exp Allergy 2016;46(9):1139-51.
9. Başaran AE, Karatas Torun N, Kocacik Uygun DF, Bingöl A. Distribution of aeroallergens on skin prick tests of atopic children living in the Akdeniz Region, Turkey. Asthma Allergy Immunology 2018;16(3):132-7.
10. Liccardi G, Calzetta L, Baldi G, Berra A, Billeri L, Caminati M, et al. Allergic sensitization to common pets (cats/dogs) according to different possible modalities of exposure: an Italian Multicenter Study. Clin Mol Allergy 2018;16:3.
11. Licari A, Magri P, De Silvestri A, Giannetti A, Indolfi C, Mori F, et al. Epidemiology of Allergic Rhinitis in Children: A Systematic Review and Meta-Analysis. J Allergy Clin Immunol Pract 2023;11(8):2547-56.
12. Zhang Y, Zhang L. Prevalence of allergic rhinitis in china. Allergy Asthma Immunol Res 2014;6(2):105-13.
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.
14. Gür MH, Uluyol S, Kılıçaslan S, Karakaya NE, Zeki Erdem MZ, Altun F. Van ilinde alerjik rinitli hastalarda prik test sonuçlarının değerlendirilmesi. Van Tıp Dergisi 2017;24(4):279-82.
15. Çelik N. Samsun ilinde ev tozu akarı türlerinin belirlenmesi ve alerjik astım ile arasındaki ilişkinin ortaya konulması. Samsun Ondokuz Mayıs University, 2009.
16. Arbes Jr SJ, Gergen PJ, Elliott L, Zeldin DC. Prevalences of positive skin test responses to 10 common allergens in the US population: results from the third National Health and Nutrition Examination Survey. J Allergy Clin Immunol 2005;116(2):377-83.
17. D'amato G, Cecchi L, D'amato M, Liccardi G. Urban air pollution and climate change as environmental risk factors of respiratory allergy: an update. J Investig Allergol Clin Immunol 2010;20(2):95-102.
18. Anderson HM, Lemanske RF, Jr., Arron JR, Holweg CTJ, Rajamanickam V, Gangnon RE, et al. Relationships among aeroallergen sensitization, peripheral blood eosinophils, and periostin in pediatric asthma development. J Allergy Clin Immunol 2017;139(3):790-6.
19. Ataş AD, Bakay BB, Bakay H, Gülpınar D. Tekirdağ ve İstanbul İllerinde Ev Tozu Akar Görülme Sıklığı ile Bunu Etkileyen Faktörlerin Belirlenmesi ve Aynı Dönemdeki Sivas İli Ev Tozu Akar Popülasyonu ile Karşılaştırılması. Turkiye Parazitol Derg 2021;45(2):137-45.
20. Pham DL, Le KM, Truong DDK, Le HTT, Trinh THK. Environmental allergen reduction in asthma management: an overview. Front Allergy 2023;4:1229238.
21. Burbach GJ, Heinzerling LM, Edenharter G, Bachert C, Bindslev-Jensen C, Bonini S, et al. GA(2)LEN skin test study II: Clinical relevance of inhalant allergen sensitizations in Europe. Allergy 2009;64(10):1507-15.
22. Pinot De Moira A, Strandberg-Larsen K, Bishop T, Pedersen M, Avraam D, Cadman T, et al. Associations of early-life pet ownership with asthma and allergic sensitization: A meta-analysis of more than 77,000 children from the EU Child Cohort Network. J Allergy Clin Immunol 2022;150(1):82-92.
23. Ownby DR, Johnson CC, Peterson EL. Exposure to dogs and cats in the first year of life and risk of allergic sensitization at 6 to 7 years of age. JAMA 2002;288(8):963-72.
24. Tun HM, Konya T, Takaro TK, Brook JR, Chari R, Field CJ, et al. Exposure to household furry pets influences the gut microbiota of infants at 3–4 months following various birth scenarios. Microbiome 2017;5(1):40.

25. Fujimura KE, Johnson CC, Ownby DR, Cox MJ, Brodie EL, Havstad SL, et al. Man's best friend? The effect of pet ownership on house dust microbial communities. J Allergy Clin Immunol 2010;126(2):410-2, 412.e1-3.
26. Froidure A, Mouthuy J, Durham SR, Chanez P, Sibille Y, Pilette C. Asthma phenotypes and IgE responses. Eur Respir J 2016;47(1):304-19.
27. Gergen PJ, Arbes SJ Jr, Calatroni A, Mitchell HE, Zeldin DC. Total IgE levels and asthma prevalence in the US population: results from the National Health and Nutrition Examination Survey 2005-2006. J Allergy Clin Immunol 2009;124(3):447-53.
28. Salo PM, Arbes SJ Jr, Jaramillo R, Calatroni A, Weir CH, Sever ML, et al. Prevalence of allergic sensitization in the United States: Results from the National Health and Nutrition Examination Survey (NHANES) 2005-2006. J Allergy Clin Immunol 2014;134(2):350-9.