Barind Medical College Journal
Abbreviated Key Title: BMCJ
ISSN: 2518-3249 (Print)
https://bmcj.org/index.php/bmcj
Volume-11 | Issue-1 | Jan-Jun, 2025 | DOI: https://doi.org/10.70818/bmcj.v011i01.0212

OPEN ACCESS

Original Research Article

Symptom-Specific Clinical Presentation of Allergic Disorders and Corresponding Serum Total IgE in A Tertiary Care Hospital of Bangladesh

Sonia Saif*[a], Sheikh Joly Ferdous Ara[b], Mohammad Morshedul Ahsan[c]

[a] Specialist, Internal Medicine, KPJ Specialized Hospital and Nursing College, Gazipur, Bangladesh
[b] Assistant Professor, Department of Microbiology, Ahsania Mission Medical College, Dhaka, Bangladesh
[c] Assistant Professor, Department of Cardiology, Shaheed Ziaur Rahman Medical College , Bogura, Bangladesh

***Correspondence to:**

Dr. Sonia Saif

Article History
Received: 13.02.2025
Accepted: 22.04.2025
Published: 30.06.2025

Abstract: ***Background*:** Allergic diseases are among the most common clinical conditions worldwide, and total serum Immunoglobulin E (IgE) is frequently used as a preliminary marker for allergic sensitization. However, the clinical utility of total IgE remains uncertain due to its variability across different symptom types and populations, especially in low-resource settings where advanced diagnostic tools are limited. ***Objectives:*** This study was aimed to quantitatively measure serum total IgE levels among Bangladeshi patients- clinically suspected of allergic diseases and to investigate the relationship between total IgE levels and their clinical presentations. ***Methods:*** A retrospective observational study was conducted using medical records of patients who underwent total serum IgE testing at KPJ Specialized Hospital, Bangladesh, between July 2023 and March 2025. A total of 105 patients meeting the selection criteria were analyzed. Allergic symptoms were categorized into four groups: cutaneous, upper respiratory, lower respiratory, and exogenous/allergen-triggered. Demographic data and IgE levels were compared across groups using descriptive and inferential statistics using SPSS (v 25.0). ***Results:*** The study included 105 participants, predominantly females (67.6%), mostly aged 21–40 years. Upper respiratory symptoms were the most frequent allergic presentation (49.52%), followed by cutaneous (32.38%), lower respiratory (12.38%), and allergen-triggered symptoms (5.71%). Females exhibited a broader spectrum of symptoms compared to males. Lower respiratory symptoms were associated with the highest mean (978.89 IU/mL) and median (584.50 IU/mL) IgE levels, while cutaneous manifestations had the lowest median IgE levels. Age-based analysis revealed that upper respiratory symptoms dominated in younger and middle-aged adults, whereas lower respiratory complaints increased with age. ***Conclusion*:** The study concludes that respiratory symptoms, especially asthma-like conditions, showed the highest IgE levels, reinforcing total IgE as a useful preliminary marker for allergy assessment. Upper respiratory symptoms were most prevalent, with females showing broader symptom diversity. Despite limitations, IgE testing remains valuable in low-resource clinical settings.

Keywords: Immunoglobulin E, Allergy, Respiratory allergy, Cutaneous symptoms, Asthma.

Cite this as: Saif S, Ara FJS, Ahsan MM. Symptom-Specific Clinical Presentation of Allergic Disorders and Corresponding Serum Total IgE in A Tertiary Care Hospital of Bangladesh. BMCJ. 2025;11(1): 204-210.

Introduction

Immunoglobulin E (IgE) testing remains a central component in the diagnostic assessment of individuals with suspected allergic disorders.[1] IgE

plays a central role in the pathophysiology of allergic diseases and is commonly elevated across a spectrum of conditions, including respiratory, cutaneous, ocular, gastrointestinal, and systemic manifestations such as anaphylaxis, as well as those triggered by exogenous contact (e.g., food, dust, or other environmental irritants).[2-4] Collectively these manifestations represent some of the most frequent clinical presentations in outpatient and primary care settings.[5] More than 20% of the global population is affected by allergic diseases driven by IgE responses.[6] Clinically, serum total IgE is often used as a supporting marker in the evaluation of patients presenting with allergy-like symptoms, despite lacking in its allergen specificity and being influenced by other factors.[7, 8] Its widespread use reflects its accessibility and value within an integrated diagnostic approach, especially in low-resource settings like Bangladesh, where advanced immunologic tests such as allergen-specific IgE assays or skin prick tests are often unavailable and expensive. In such contexts, clinicians rely on clinical history, symptom patterns, and total IgE levels for preliminary assessment. Most existing studies in Bangladesh focus on disease-specific cohorts (e.g., asthma or atopic dermatitis) and miss the mark to examine IgE profiles across a broader spectrum of allergic symptoms. Given the rising burden of allergy-related complaints globally as well as in Bangladesh particularly in urban areas, there is an urgent need to clarify the clinical utility of total IgE testing in practical clinical practice.[9, 10] A clearer understanding of how IgE levels vary across symptom categories can support more rational testing, reduce diagnostic ambiguity, and guide more cost-effective allergy management. Thus, this retrospective study aims to examine the variation in total serum IgE levels among patients presenting with distinct allergic symptom profiles, including respiratory, dermatologic, and allergen-triggered complaints to explore the relationship between patients' allergy-related symptoms and their corresponding serum total IgE levels.

Methodology

This retrospective observational study was conducted at KPJ Specialized Hospital, Bangladesh, using medical records from July 2023 to March 2025. The study population consisted of patients of all ages who underwent serum total IgE testing during this period, with purposive sampling used to select eligible cases based on predefined criteria. Prior to enrollment, informed written consent was obtained from all participants, and ethical approval was obtained from the Institutional Review Board (IRB) of KPJ Specialized Hospital.

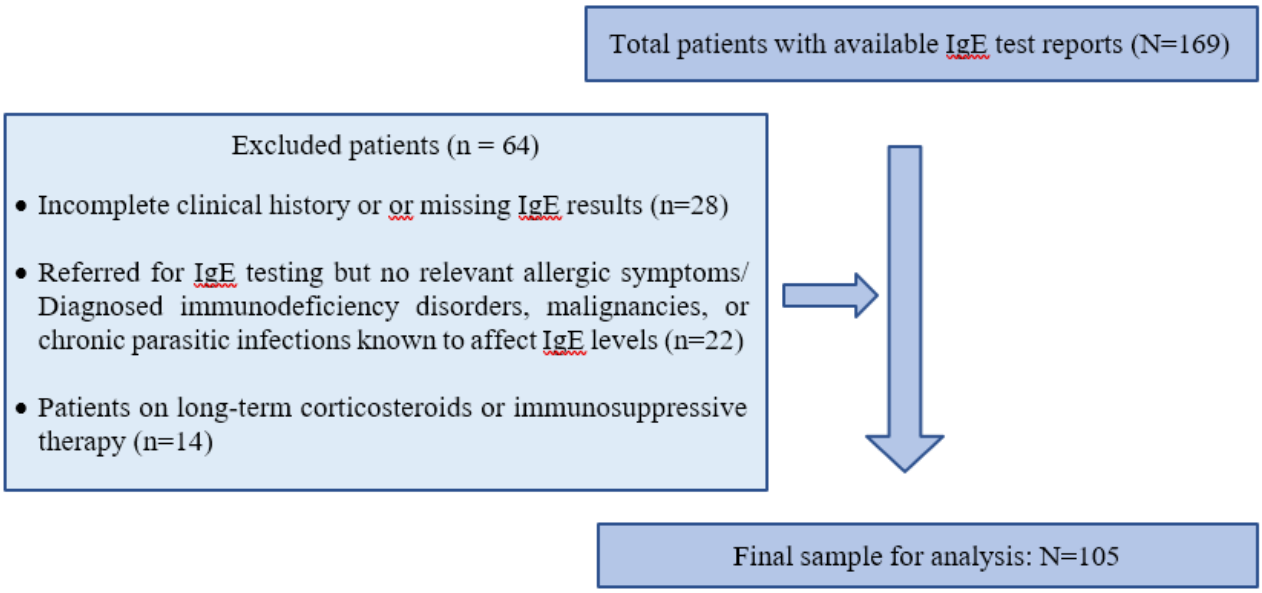
Inclusion criteria

Patients of any age with documented clinical features suggestive of allergic disorders, including cutaneous, upper or lower respiratory, or allergen-triggered manifestations, even when symptoms are atypical or not clearly defined at presentation. Availability of serum total IgE test results within the study period. Complete documentation of clinical presentation and relevant medical history.

Exclusion criteria

Patients with incomplete clinical records or missing IgE results. Diagnosed immunodeficiency disorders, malignancies, or chronic parasitic infections known to affect IgE levels. Patients on long-term corticosteroids or immunosuppressive therapy at the time of IgE testing

Patient selection



Operational definition

In this study, cutaneous manifestations were defined as allergic symptoms primarily affecting the skin, including itching, urticarial rashes, eczema, psoriasis, or other eruptions, without dominant respiratory or systemic features. Upper respiratory manifestations referred to symptoms involving the upper airway, such as frequent colds, sneezing, nasal congestion, runny nose, hoarseness of voice, and allergic rhinitis, in the absence of lower airway signs. Lower respiratory manifestations were characterized by symptoms of lower airway involvement, including asthma, wheezing, shortness of breath, or cough variant asthma, regardless of formal asthma diagnosis. Exogenous/allergen-triggered manifestations were defined as allergic symptoms clearly provoked by identifiable external allergens (e.g., food, dust, chemicals, animal fur, or temperature changes), with or without associated skin or respiratory features, where the presence of a trigger was the key determinant.

Data collection and Data analysis

Data were extracted from hospital records using a standardized form. Key variables included demographic details (age, sex), presenting symptoms, serum total IgE levels, comorbidities, and relevant medication history. Symptoms were categorized into respiratory, dermatologic, mixed, or other allergic manifestations. Descriptive statistics were used to summarize patient characteristics and IgE distributions. Comparative analyses were performed to assess the relationship between symptom categories and IgE levels. Statistical analysis was conducted using SPSS (version 25).

Result

The sample comprised 105 individuals, with a higher proportion of females (67.62%) than males (32.38%). The majority of participants were between 21 and 40 years of age, with 28.57% aged 21–30 years and 26.67% aged 31–40 years. Adolescents under 20 years accounted for 19.05% of the sample, while those aged 41–50 and above 50 constituted 14.29% and 11.43%, respectively (Table 1).

Table 1: Age And Gender Distribution of the Sample (N=105)

Category	Frequency (n)	Percentage (%)
Gender		
Male	34	32.38%
Female	71	67.62%
Age		
11-20	20	19.05%
21-30	30	28.57%
31-40	28	26.67%
41-50	15	14.29%
Above 50	12	11.43%

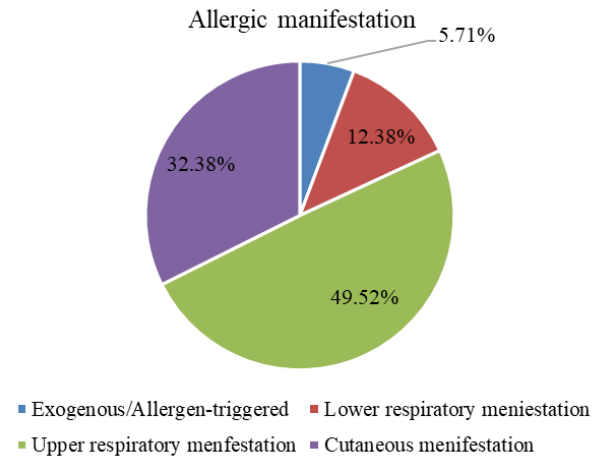


Figure 1: Distribution of the Allergic Manifestation of the Sample (N=105)

Figure 1 presents the overall distribution of allergic manifestations. Upper respiratory symptoms were the most commonly reported (49.52%), followed by cutaneous manifestations (32.38%). Lower respiratory symptoms accounted for 12.38%, while exogenous/allergen-triggered complaints were the least frequent (5.71%).

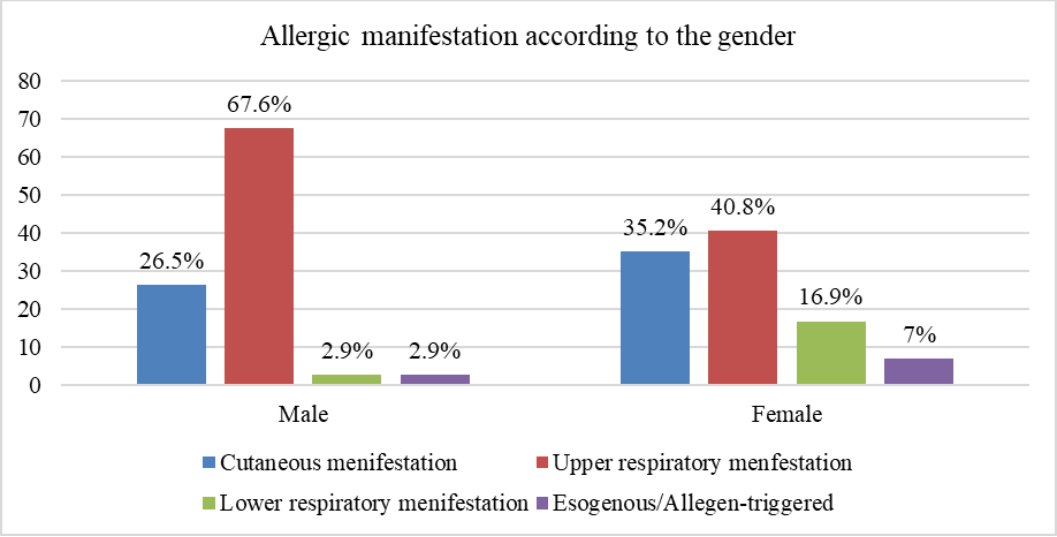


Figure 2: Distribution Of the Allergic Manifestation According to The Gender of The Sample (N=105)

Figure 2 illustrates the gender-based distribution of allergic manifestations. Among males, upper respiratory symptoms were predominant (67.6%), with cutaneous symptoms reported by 26.5%. Lower respiratory and allergen-triggered complaints were rare (2.9% each). In contrast, females exhibited a more balanced distribution, with upper respiratory and cutaneous symptoms reported by 40.8% and 35.2%, respectively. Notably, lower respiratory symptoms (16.9%) and allergen- triggered manifestations (7.0%) were more prevalent among females.

Allergic symptoms varied across age groups (Table 2). Upper respiratory symptoms were most common in adolescents (11–20 years, 60.0%) and the 31–40 age group (60.7%). Cutaneous manifestations peaked among young adults aged 21–30 years (43.3%). Among those aged 41–50 years, respiratory (46.7%) and skin-related symptoms (40.0%) were similarly prevalent. In participants over 50 years, both cutaneous and respiratory manifestations were equally reported (41.7%), while allergen-triggered symptoms were absent in the two oldest groups. A gradual increase in lower respiratory symptoms with advancing age particularly from 31 years onward may suggest an age-linked rise in asthma-like conditions.

Table 2: Distribution Of the Allergic Manifestation According to the of The Sample (N=105) Different Age Groups

Variables	Cutaneous manifestation		Upper respiratory manifestation		Lower respiratory manifestation		Exogenous/ Allergen- triggered	
Age group	**n**	**%**	**n**	**%**	**n**	**%**	**n**	**%**
11-20 years	5	25.00%	12	60.00%	2	10.00%	1	5.00%
21-30 years	13	43.30%	11	36.70%	2	6.70%	4	13.30%
31-40 years	5	17.90%	17	60.70%	5	17.90%	1	3.60%
41-50 years	6	40.00%	7	46.70%	2	13.30%	0	0.00%
Above 50 years	5	41.70%	5	41.70%	2	16.70%	0	0.00%

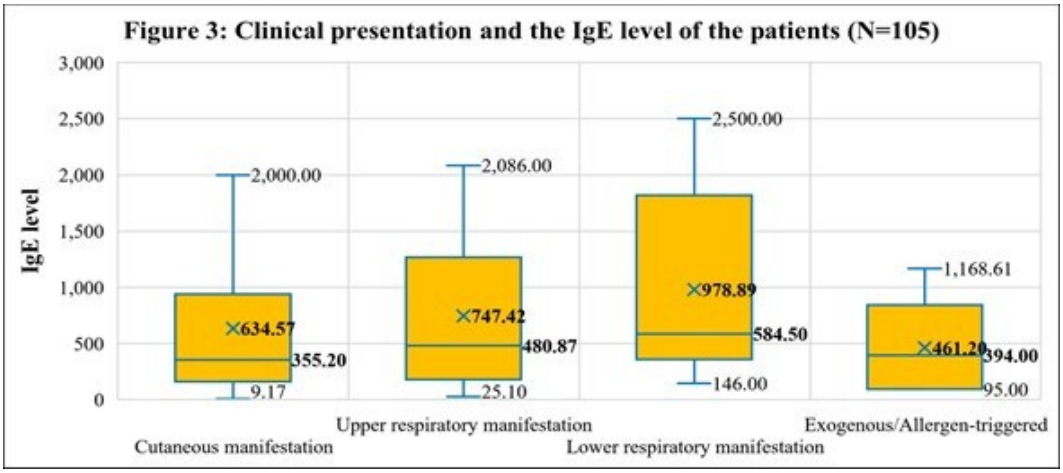


Figure 3: Clinical presentation and the IgE level of the patients (N=105)

The distribution of serum IgE levels across allergic symptom showed that lower respiratory manifestations had the highest median (584.50 IU/mL) and mean (978.89 IU/mL) IgE levels, consistent with the systemic nature of asthma and its immunologic basis. Upper respiratory symptoms also demonstrated elevated IgE responses, with a median of 480.87 IU/mL and a mean of 747.42 IU/mL. Cutaneous manifestations had a lower median IgE level (355.20 IU/mL), although the mean value was relatively high (634.57 IU/mL), indicating variability within this group. Exogenous/allergen-triggered cases displayed moderate and consistent IgE levels, with a median of 394.00 IU/mL and a mean of 461.20 IU/mL (Figure 3).

Discussion

Our cross-sectional analysis of 105 individuals reveals notable patterns in allergic manifestations across gender, age, and symptom categories, which align with and extend findings from the existing literature. Findings from this study exhibits that while upper respiratory symptoms are the most prevalent across both sexes, males tend to exhibit a more limited symptom profile, primarily involving respiratory manifestations. In contrast, females experience a broader spectrum of allergic symptoms, including not only respiratory but also cutaneous, and allergen-triggered reactions. This gender-based divergence aligns with researches indicating that after puberty, females are more prone to respiratory allergies and asthma than males, consistent with hormonal modulation of immune responses particularly estrogen-mediated upregulation of FcεRI on mast cells and IL-13 expression.[11, 12] Additionally, large-scale studies report higher healthcare use, poorer quality of life, and more severe comorbidities in females with IgE-mediated respiratory symptoms despite similar objective severity metrics of both sexes.[13, 14] The sex-based IgE differences may be reinforced by epigenetic and miRNA regulation where females show elevated IL-13 and Th2 signaling, while certain X-chromosome linked genes (e.g., TLR7/8) and epigenetic modifications augment immune hyperreactivity.[16-18] Such mechanisms may underpin the broader symptom diversity and higher IgE levels seen in females across symptom categories. Our data show a peak of upper respiratory symptoms

in adolescents and early to mid-adulthood (60.0% in ages 11–20 and 60.7% in 31–40), while cutaneous symptoms were more frequent among young adults (43.3%). These patterns mirror epidemiological reports that allergen sensitization typically peaks in the 20s and then declines with age, and that symptom profiles shift with age- related changes in immune reactivity and exposure history.[15] Notably, this study observed that, lower respiratory symptoms gradually increase with age, particularly from 31 years onward, indicating a possible age-linked rise in asthma-like conditions, which aligns with previous researches showing age-linked escalation of non-atopic and non-allergic asthma in adults, particularly in women.[16] Lower respiratory manifestations in our cohort were associated with the highest IgE levels (median = 584.5 IU/mL; mean = 978.9 IU/mL), consistent with with literature identifying asthma and systemic allergic reactions as producing robust IgE responses.[17, 3] Upper respiratory manifestations also showed elevated IgE, while cutaneous and allergen-triggered groups exhibited lower or moderate levels. This corresponds with pathophysiologic understanding that systemic and airway-based allergic conditions often generate stronger IgE responses than localized cutaneous reactions, which may be influenced by differing Th2 cytokine profiles and tissue-specific IgE production.[18]

Limitations of the study

This study has several limitations that may affect the interpretation of its findings. The reliance on total IgE measurements, without accompanying allergen-specific IgE data, limits diagnostic specificity, as elevated total IgE levels can result from non-allergic causes such as parasitic infections, smoking, or genetic factors. The sample, drawn from a single private hospital, may not adequately represent the broader population, particularly individuals from rural or underserved areas.

Conclusion

This study explored the association between clinical allergy manifestations and total serum IgE levels in a diverse outpatient population in Bangladesh. The results revealed that upper respiratory symptoms were the most prevalent across all demographic groups, while cutaneous manifestations were particularly common among younger adults. Females exhibited a broader range of allergic symptoms compared to males, with higher frequencies of lower respiratory and allergen-triggered complaints. Importantly, individuals with respiratory symptoms demonstrated the highest total IgE levels, underscoring the immunologically robust nature of conditions such as asthma and cold related conditions. These findings suggest that, despite its known limitations, total IgE remains a useful preliminary marker when interpreted within the clinical context especially in low-resource settings where allergen-specific diagnostics are limited.

Acknowledgement

The authors would like to express their sincere gratitude to the administrative and medical staff of KPJ Specialized Hospital, Bangladesh, for their support in accessing patient records and facilitating data collection. Special thanks to the laboratory personnel for their assistance in retrieving IgE test reports.

Funding: No external funding was received for the present study.

Conflict of interest: The authors declare no conflict of interest.

References

1. Ansotegui IJ, Melioli G, Canonica GW, Caraballo L, Villa E, Ebisawa M, et al. IgE allergy diagnostics and other relevant tests in allergy, a World Allergy Organization position paper. World Allergy Organ J 2020; 13:100080. https://doi.org/10.1016/j.waojou.2019.100080.
2. Waserman S, Bégin P, Watson W. IgE-mediated food allergy. Allergy Asthma Clin Immunol Off J Can Soc Allergy Clin Immunol 2018; 14:55. https://doi.org/10.1186/s13223-018- 0284-3.
3. Hardin MD, Glyburide JT. Treasure Island. StatPearls FL: StatPearls Publishing. 2022.
4. Navalpakam A, Thanaputkaiporn N, Poowuttikul P. Management of anaphylaxis. Immunology and Allergy Clinics. 2022 Feb 1;42(1):65-76.
5. Demoly P, Chabane H, Fontaine J-F, de Boissieu D, Ryan D, Angier E, et al. Development of algorithms for the diagnosis and management of acute allergy in primary practice. World Allergy Organ J 2019; 12:100022. https://doi.org/10.1016/j.waojou.2019.100022.
6. WHO. Prevention of Allergy and Allergic Asthma, Geneva, Switzerland: 2002.
7. Saglam NO, Ozkars MY, Altas U, Altas ZM. Evaluation of the predictive value of total IgE and

absolute eosinophil levels on allergy test positivity. North Clin Istanb 2023; 10:602–8. https://doi.org/10.14744/nci.2023.44827.

8. Al-Mughales JA. Diagnostic Utility of Total IgE in Foods, Inhalant, and Multiple Allergies in Saudi Arabia. J Immunol Res 2016; 2016:1058632. https://doi.org/10.1155/2016/1058632.
9. D'Amato G, Chong-Neto HJ, Monge Ortega OP, Vitale C, Ansotegui I, Rosario N, et al. The effects of climate change on respiratory allergy and asthma induced by pollen and mold allergens. Allergy 2020; 75:2219–28. https://doi.org/10.1111/all.14476.
10. Emdadul Hoque. Allergic Rhinitis in Bangladesh: Unveiling the Tapestry of Patterns, Coping Strategies, Risk Factors and Impact on Daily Activities among Adult Population - A Cross-Sectional Study at a Tertiary Hospital. Cent Med Coll J 2024; 7:97–107. https://doi.org/10.3329/cemecj.v7i2.74422
11. Mokra D, Barosova R, Mokry J. Sex-Based Differences in Bronchial Asthma: What Are the Mechanisms behind Them?. Applied Sciences. 2023 Feb 19;13(4):2694.
12. Ikuta K, Ejima A, Abe S, Shimba A. Control of immunity and allergy by steroid hormones. Allergology International. 2022;71(4):432-6.
13. Lee JH, Haselkorn T, Chipps BE, Miller DP, Wenzel SE, Tenor Study Group. Gender differences in IgE-mediated allergic asthma in the epidemiology and natural history of asthma: Outcomes and Treatment Regimens (TENOR) study. J Asthma Off J Assoc Care Asthma 2006; 43:179–84. https://doi.org/10.1080/02770900600566405.
14. De Martinis M, Sirufo MM, Suppa M, Di Silvestre D, Ginaldi L. Sex and Gender Aspects for Patient Stratification in Allergy Prevention and Treatment. Int J Mol Sci 2020; 21:1535. https://doi.org/10.3390/ijms21041535.
15. Hong S-N, Won JY, Nam E-C, Kim TS, Ryu Y-J, Kwon J-W, et al. Clinical Manifestations of Allergic Rhinitis by Age and Gender: A 12-Year Single-Center Study. Ann Otol Rhinol Laryngol 2020; 129:910–7. https://doi.org/10.1177/0003489420921197.
16. Leynaert B, Sunyer J, Garcia-Esteban R, Svanes C, Jarvis D, Cerveri I, et al. Gender differences in prevalence, diagnosis and incidence of allergic and non-allergic asthma: a population-based cohort. Thorax 2012; 67:625–31. https://doi.org/10.1136/thoraxjnl-2011- 201249.
17. Froidure A, Mouthuy J, Durham SR, Chanez P, Sibille Y, Pilette C. Asthma phenotypes and IgE responses. Eur Respir J 2015; 47:304–19. https://doi.org/10.1183/13993003.01824-2014.
18. De Martinis M, Sirufo MM, Suppa M, Di Silvestre D, Ginaldi L. Sex and gender aspects for patient stratification in allergy prevention and treatment. International journal of molecular sciences. 2020 Feb 24;21(4):1535.