AN INVESTIGATIVE CASE STUDY ON ALLERGEN SPECTRUM AMONG PATIENTS IN WESTERN ROMANIA

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Abstract: Immunoglobulin E (IgE)-mediated allergy is the most common form of hypersensitivity disorder, affecting approximately 30% of the global population. In atopic individuals, exposure to even trace amounts of allergens can trigger the production of IgE antibodies. Food allergy is defined as an adverse immunological response to a dietary protein. Respiratory allergic disorders, including allergic rhinitis and allergic asthma, constitute major public health concerns, with a rising global prevalence. These conditions typically emerge in the spring, coinciding with the airborne dispersion of plant pollen. The present study aims to conduct a case analysis focusing on the spectrum of allergens identified in patients from the western region of Romania.
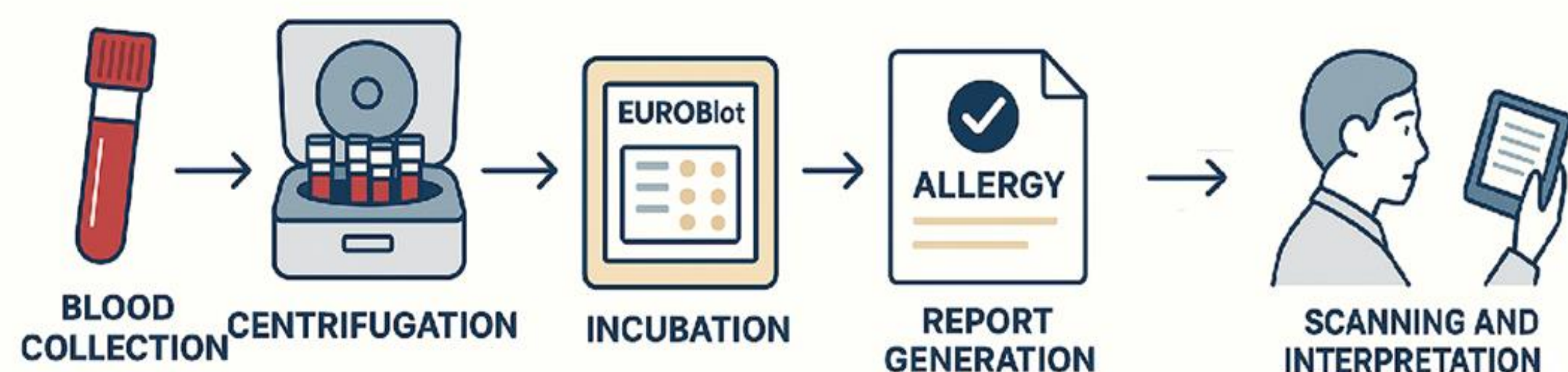
Introduction

Allergens are proteins or glycoproteins that bind to immunoglobulin E (IgE), triggering allergic reactions in susceptible individuals. Allergic sensitization, often beginning in early childhood, leads to the production of allergen-specific IgE and affects up to 30–40% of the global population. Cross-reactivity reflects phylogenetic relationships between organisms and is based on immunological recognition. Two allergens are considered cross-reactive when a single antibody or T lymphocyte is capable of reacting with both This paper presents a case study analyzing allergen types in patients from western Romania.

Material and method

Raw data was collected between January 4, 2021 and October 23, 2021 from 152 patients. Out of the 152 patients analyzed, most were in the 31–40 age group, followed by the 1–10 and 21–30 groups. In terms of gender, 85 were male and 67 female.

Human serum was obtained via centrifugation of whole blood, and IgE antibodies were detected using a Western blot-based system. Final results were obtained through strip scanning, providing IgE titers and corresponding clinical classification.
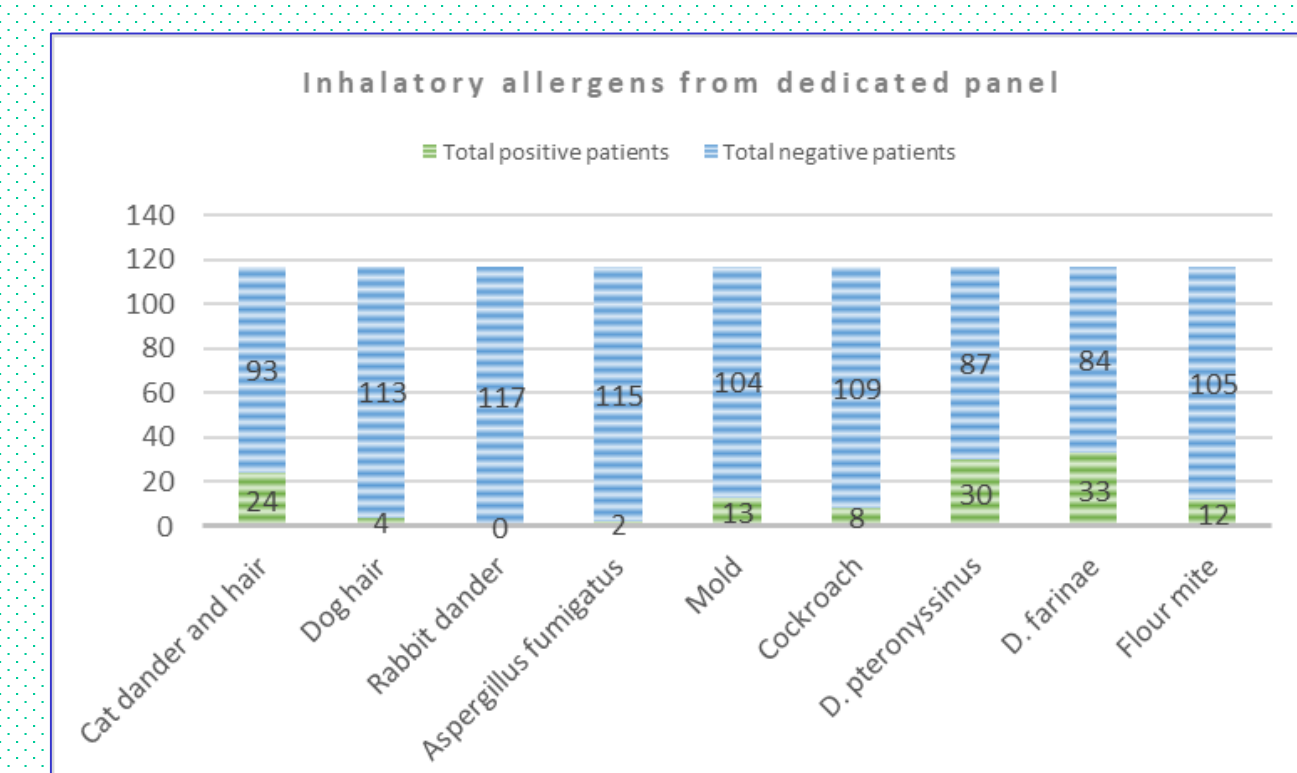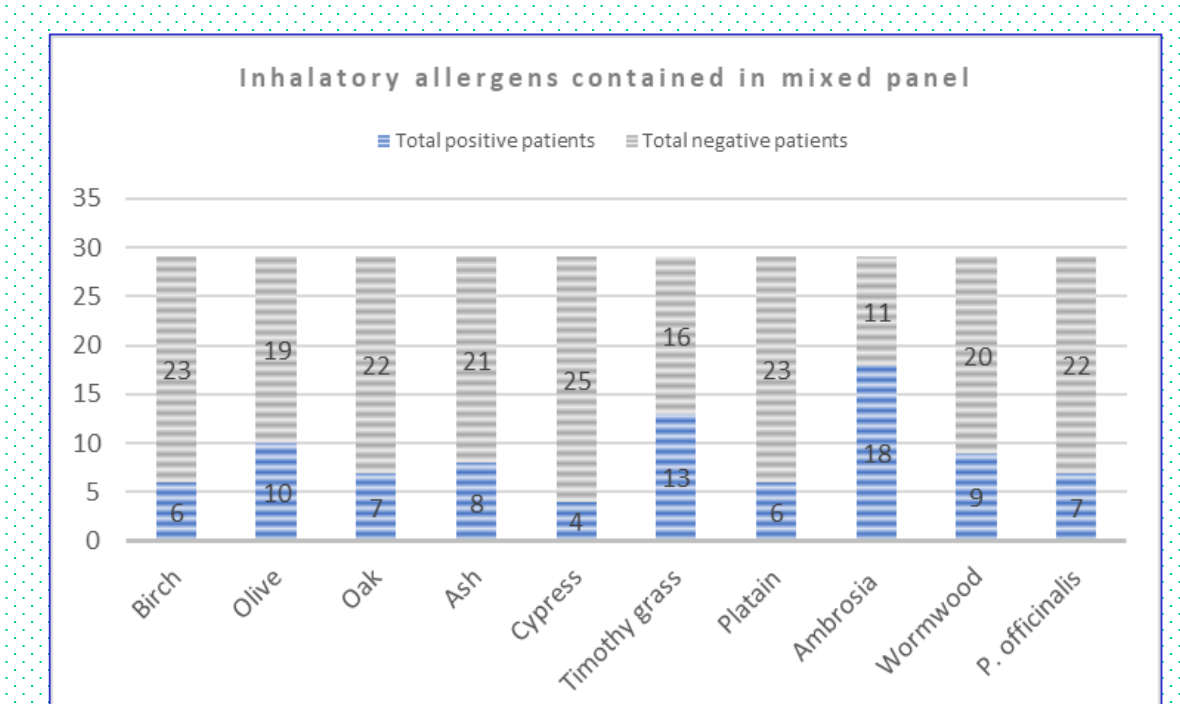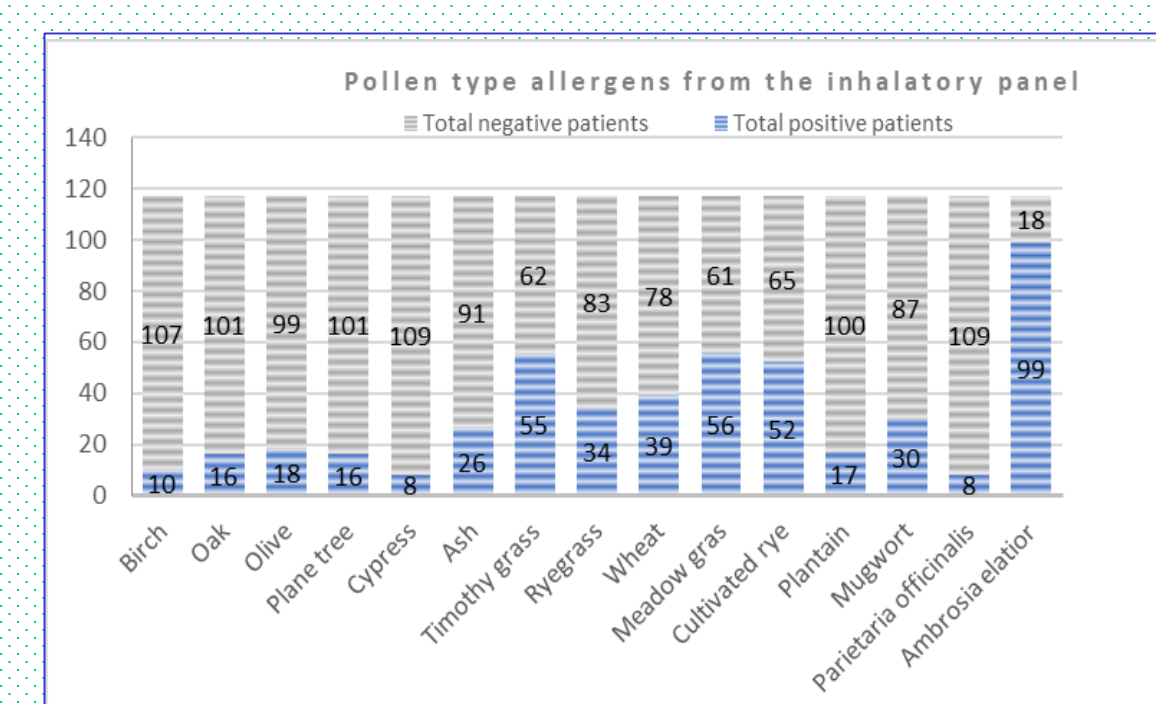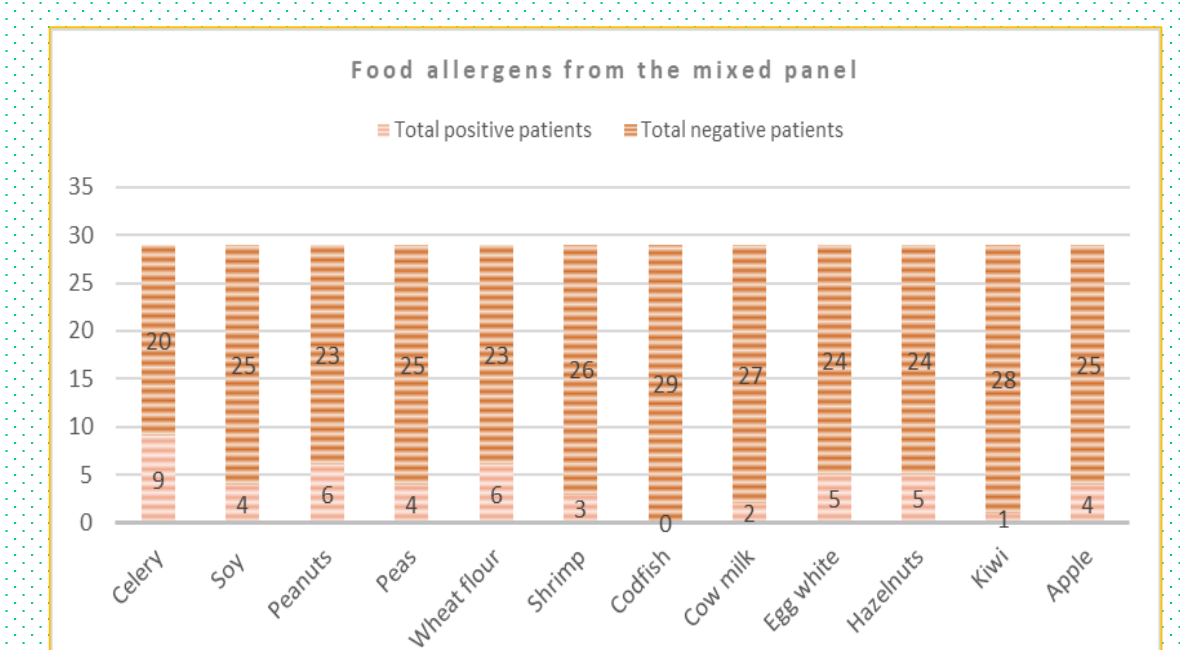

BLOOD COLLECTION → CENTRIFUGATION → INCUBATION (EUROBlot) → REPORT GENERATION (ALLERGY) → SCANNING AND INTERPRETATION
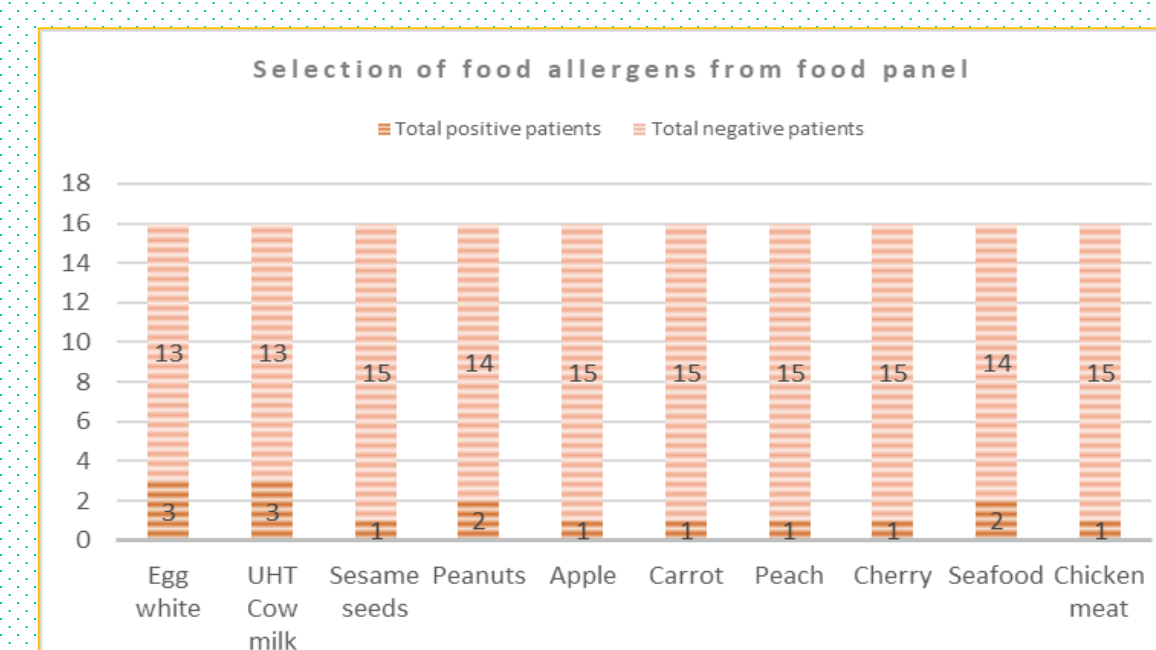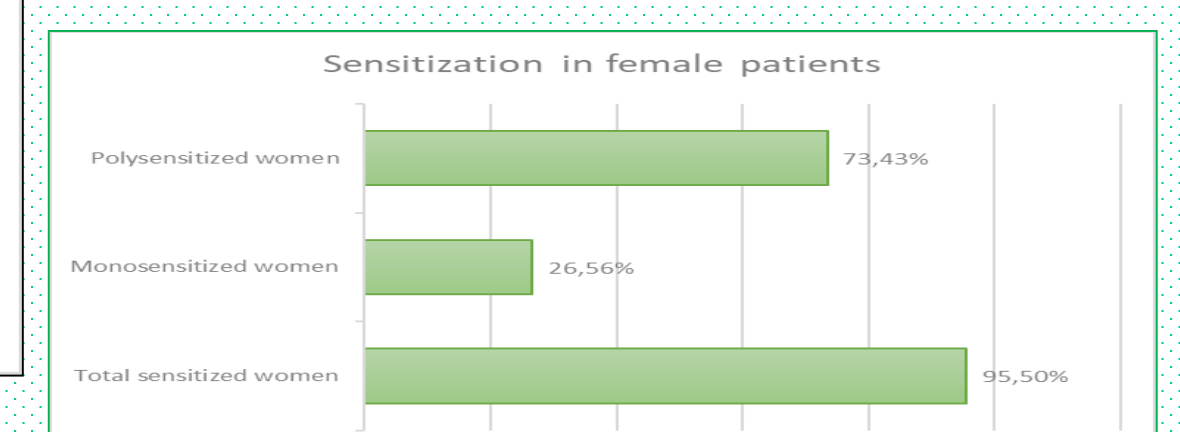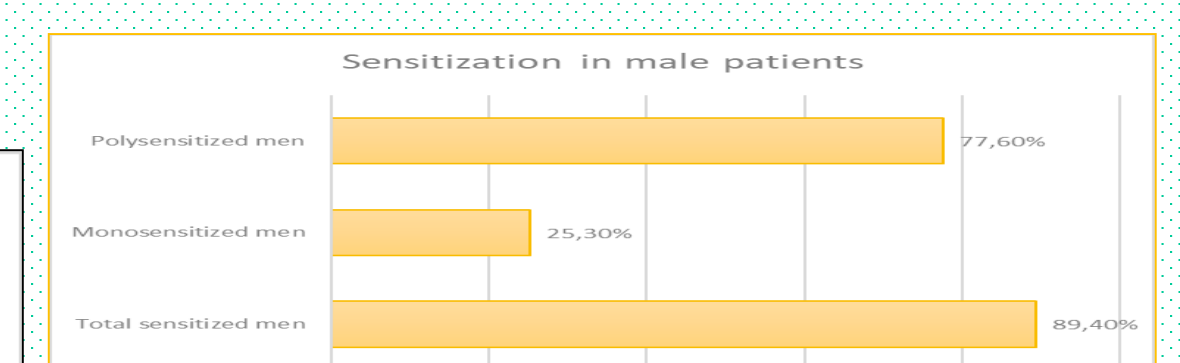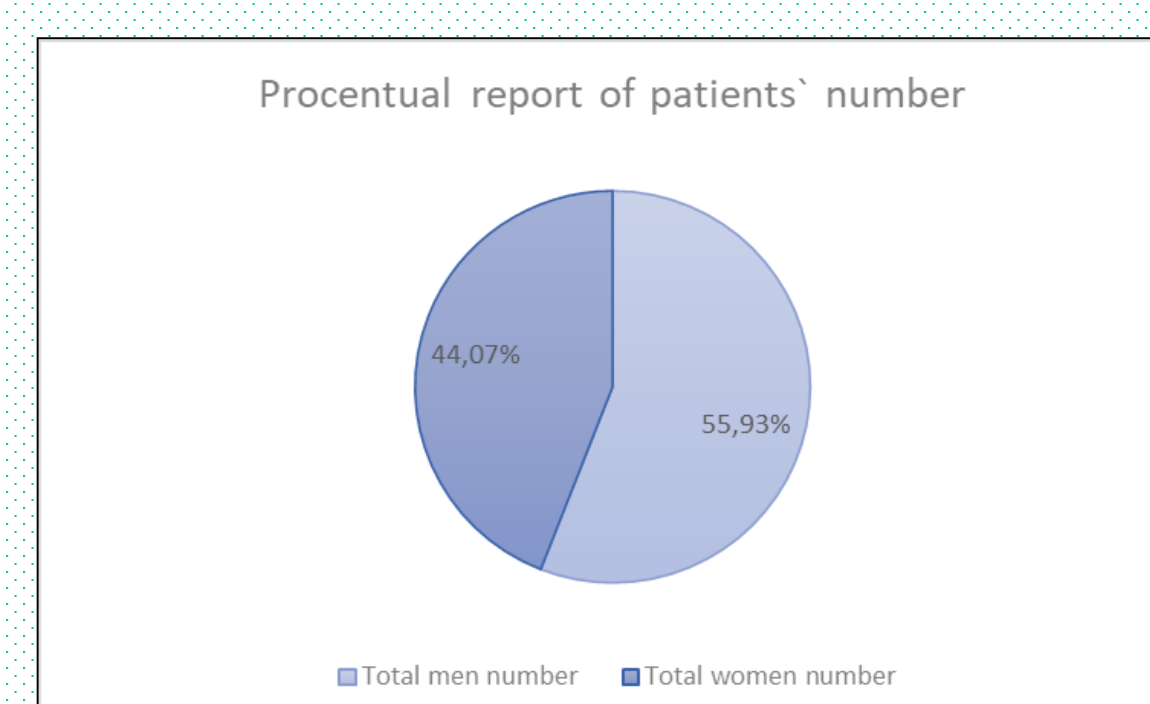
Allergy panels were categorized into food, respiratory, and mixed types. The study analyzed a wide range of clinically significant allergens, as shown below.

Food panel
- Egg white
- Egg yolk
- Casein
- Wheat flour
- Gluten
- Strawberries
- Rice
- Soy
- Sesame seeds
- Peanuts
- Cow's milk
- Hazelnuts
- Pistachios
- Apple
- UHT cow's milk
- Tomato
- Sunflower seeds
- Pumpkin seeds
- Cocoa
- Green beans
- Banana
- Kiwi
- Mulberries
- Beef and lamb
- Fig
- Orange
- Carrot
- Potato
- Peach
- Cherry
- Onion
- Olives
- Mixed fish
- Seafood
- Chicken meat

Inhalatory panel
- Birch pollen
- Oak pollen
- Cypress pollen
- Olive pollen
- Plane tree pollen
- Ash tree pollen
- Timothy grass
- Ryegrass
- Wheat
- Meadow grass
- Cultivated rye
- Plantain
- Mugwort
- Wall pellitory
- *Ambrosia elatior* (ragweed)
- Cat dander and hair
- Dog hair
- Rabbit dander
- *Aspergillus fumigatus*
- Mold
- Cockroach
- *Dermatophagoides pteronyssinus*
- *Dermatophagoides farinae*
- Flour mite

Mixed panel
- Celery
- Soy
- Peanuts
- Peas
- Wheat flour
- Shrimp
- Codfish
- Egg white
- Hazelnuts
- Kiwi
- Cow's milk
- Apple
- Olive pollen
- Birch pollen
- Plantain
- Cypress
- Wall pellitory
- Oak
- Timothy grass
- Common ragweed
- Ash
- Mugwort
- Cat dander
- Dog hair
- *Aspergillus fumigatus*
- Mold
- *Dermatophagoides pteronyssinus*
- *Dermatophagoides farinae*

Class - clinical classification based on IgE titers	Value	Interpretation
Class 0	<0.35 kU/l	No specific antibodies detected
Class 1	0.36–0.70 kU/l	Very low specific antibodies titer detected. Mainly without clinical symptoms
Class 2	0.71–3.50 kU/l	Low titer of specific antibodies – Clinical symptoms possible, particularly as values approach the upper limit of the range.
Class 3	3.51–17.50 kU/l	Moderately increased titer of specific antibodies – Clinical symptoms usually present.
Class 4	17.51–50.00 kU/l	Elevated titer of specific antibodies – Clinical symptoms almost always present.
Class 5	50.00–100 kU/l	Very high titer of specific antibodies.
Class 6	>100 kU/l	Extremely high titer of specific antibodies.

Results and discussions

Procentual report of patients' number

Sensitization in male patients

Sensitization in female patients

Selection of food allergens from food panel

Food allergens from the mixed panel

Pollen type allergens from the inhalatory panel

Inhalatory allergens contained in mixed panel

Inhalatory allergens from dedicated panel

Conclusions

The results of this study revealed a higher sensitization rate among female patients compared to males. Furthermore, polysensitization was more common than monosensitization, highlighting the complex nature of allergen exposure. Among the inhalant allergens tested, pollen emerged as the most frequent trigger, indicating its prominent role in respiratory allergic responses. These findings may serve as a valuable starting point for evaluating the regional burden of allergic diseases and their impact on public health. To gain a more comprehensive understanding of sensitization patterns and contributing environmental factors, further large-scale, population-based studies are warranted.

Bibliography

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