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# The range of sensitization to the allergens in the children and youth of Vinnytsia region with respiratory allergy

**Key words:** sensitization, allergens, allergic rhinitis, bronchial asthma, children and young people.

A characteristic feature of recent decades is almost geometric progression of increasing of the number of allergic diseases (AD), covering from 20 to 40 % of the population around the world [7, 10]. Epidemiological studies clearly confirmed this fact about double, and sometimes three times increasing in the prevalence of AD [6, 8]. One of the leading places in the structure of AD occupied bronchial asthma (BA) and allergic rhinitis (AR) [5, 9, 11]. Thus, the prevalence of asthma varies from 5 % to 10 % in the general population, AR - from 10 to 25 % [4, 12]. Some authors noticed the fact that the maximum prevalence of AD is observed among children and young adults [1-3]. That's why early detection and investigation of AD at the point of range of sensitization to inhaled allergens (AG) is important because this analysis makes it possible to study the factors that determine the formation of capable and severe of AD to conduct effective preventive measures.

The aim is to study the spectrum of sensitization to allergens in the children and youth of Vinnytsia region with asthma and / or allergic rhinitis.

## Materials and methods

In order to identify the causative AG all the patients with the AR and asthma were examined by the standard procedure conducted collecting allergic history, physical examination and skin tests (prick test) with Ukrainian AG produced by MP «Immunolog» – domestic, epidermal, pollen and food AG at a concentration 10 000 PNU / ml. The corresponding study was conducted among 524 people with AR and 343 people with asthma aged 3 to 27 years. Children aged 3 to 6 years old entered the 1st age group,

children aged 7 to 18 years – to the 2nd age group, young people aged 19 to 27 years – the 3rd age group.

## Results and discussion

Results showed that in all age groups with AR it was the prevalence of perennial allergic rhinitis (PAR) – 70.04% (95% CI: 0.67, 0.72 (367 people)). Significantly less weight had seasonal AR (SAR) – 29.96% (95% CI: 0.27, 0.32 (157)), the difference is significant at  $p < 0.05$ . The data by using prick test showed that in the most cases (189 persons or 51.5% of cases) in the PAR had a hypersensitivity only to household AG and in 41 (11.2%) persons manifested only epidermal AG. In addition, often (137 persons or 37.3% of cases) patients with PAR had a sensitization with more multiple character, as was observed hypersensitivity to two or more groups of AG.

Among the patients with PAR sensitization to house dust mites (*D. pteronissimus* and *D. farinae* – 287 (78.2%; 95 % CI: 0.72; 0.84) cases) is often manifested. Sensitization to the pillows was observed in 154 (41.96%, 95 % CI: 0.38, 0.46) person and hypersensitivity to cat epidermis was found in 79 individuals (21.53% 95 % CI: 0.18, 0.24), the difference between the frequencies of the indicator groups is statistically significant in all cases,  $p < 0.05$ . Significantly less compared to the previous data we registered hypersensitivity to dogs and sheep wool, in 49 (13.35%) and 23 (6.27%) patients, respectively, the difference between the frequencies of the indicator groups is statistically significant in all cases,  $p < 0.05$ .

Ethiological factors of SAR in our study were AG of pollen grains – 82 patients (52.24%, 95 % CI: 0.48, 0.57),

trees – 43 people (7.39%, 95 % CI: 0.22, 0.32) and weeds – 32 people (20.36%, 95 % CI: 0.17, 0.23). A more detailed analysis of pollen sensitization spectrum made it possible to identify the most representative allergenic substances for Vinnytsia region. Birch pollen which is quite common cause of SAP in many areas, took the first place and was the cause of sensitization to 12 people (7.64%) (95% CI: 0.05, 0.09), alder and hazel AG took second and third places rank among hypersensitivity to the pollen of trees, 8 people (5.10%, 95 % CI: 0.03, 0.07) and 7 persons (4.46%, 95 % CI: 0.02; 0.07), respectively. Among the cereals most frequently and almost equally detected sensitization to *Lolium perenne* – 6 patients (10.19%, 95 % CI: 0.08, 0.12), chaff – 16 people (10.19%, 95 % CI : 0.08, 0.12) and *dactylis* – 15 people (9.56%, 95 % CI: 0.08, 0.12). Among the weeds unusually high enough for children and youth of our region turned frequency of sensitization to ragweed pollen: 5 people (3.18%, 95 % CI: 0.01; 0.05), which was provided with the same frequency as compared to AG quinoa – 5 people (3.18%, 95 % CI: 0.01, 0.05) and was almost identical with the frequency of sensitization to *Artemisia* AG - 6 people (3.82%, 95 % CI: 0.01; 0.06) and wheat grass – 6 people (3.82%, 95 % CI: 0.01, 0.06).

It should be emphasized that, according to allergy examination, the results of which are shown in Figure 1, the majority of patients with SAP identified multiple (two or more groups of pollen AG) sensitization, to three different groups of pollen AG was noted in 41.41% (65 people) examined patients, to two different groups of pollen AG - 69 people (43.94%) and monovalent (one group of pollen AG) – in 14.65% (23 people) cases.

By analyzing the characteristics of pollen sensitization among the patients with SAR, depending on their age

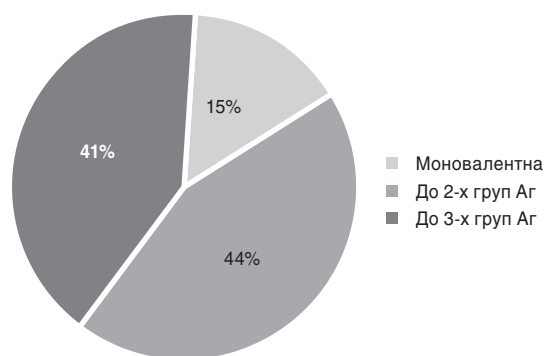


Fig. 1. Frequency of mono- and polysensitization to pollen AG in patients with SAR

we noticed the attention to expansion of hypersensitivity to pollen AG with age. In particular, among the surveyed first age group, more than half (54.84%) patients revealed a sensitization to pollen group AG, among 2nd and 3rd groups monosensitization revealed significantly less – at 4.49% and 5.41% of patients, respectively,  $p < 0.05$  in both cases. Among older children and youth prevailed sensitization to pollen AG of the two groups – at 48.31% and 54.05% of, respectively, compared to (19.35% of patients) with younger children,  $p < 0.05$  in both cases. Sensitization to three groups of pollen AG also revealed significantly more common among older children and young people compared to younger children, 44.95% of people with second age group and in 40.54% of patients with the 3rd age group, compared with younger age group, in which three groups of sensitization to pollen hypersensitivity was detected in 25.81% of those with  $p < 0.05$  in both cases.

Similarly structure was observed with sensitization in patients with asthma. Only 123 people (35.86%, 95 % CI: 0.30, 0.41) was found with monovalent sensitization to AG. Instead the structure of hypersensitivity more frequently in the patients met the combination of two or more groups AG - 220 people (64.14%, 95 % CI: 0.58, 0.69). With absolute advantage among the patients with asthma were registered sensitization household, which took place in 301 surveyed (87.7%, 95 % CI: 0.83, 0.90), less often detected sensitization to food AG - 49 people (14.3%, 95 % CI: 0.10, 0.18). Intermediate took place sensitization to pollen and epidermal AG, which was detected in 164 (47.8%; 95 % CI: 0.42, 0.53) and 86 individuals (25.1%, 95 % CI: 0.20; 0.29), respectively.

The frequency of hypersensitivity to the different allergens in the patients with asthma, depending on the degree of severity is presented in Table 1. These data show that regardless of the severity of asthma in the patients was significantly dominated household allergies, which took place in 105 people (88.2%, 95 % CI: 0.81, 0.92) with less severe asthma in 111 people (90.2%, 95 % CI: 0.83, 0.94) in the medium-heavy and 85 people (84.2%, 95 % CI: 0.75, 0.90) in severe disease. While sensitization to food of hypertension was detected rarely and did not depend on the severity of asthma. It was noted in 17 individuals (14.3%, 95 % CI: 0.09, 0.21) with mild, 18 people (14.6%, 95 % CI: 0.09; 0.22) with moderate and 14 people (13.9% of cases, 95 % CI: 0.08, 0.22) in severe disease.

So, regardless of the severity of asthma, almost equally (the difference between the frequencies of signs in insignificant groups,  $p > 0.05$ ), noted the multiple character

Allergens	Mild (n = 119)	Moderate (n = 123)	Severe (n = 101)	$\phi_{emp1}$	$\phi_{emp2}$	$\phi_{emp3}$
Domestic	105 (88,2)	111 (90,2)	85 (84,2)	0,506*	0,857*	1,348*
Pollen	64 (53,8)	59 (48,0)	41 (40,6)	0,902*	1,959*	1,111*
Epidermal	35 (29,4)	27 (22,0)	24 (24,0)	1,322*	0,939*	0,320*
Food	17 (14,3)	18 (14,6)	14 (13,9)	0,062*	0,089*	0,149*
Multisensitization	73 (61,34)	79 (64,23)	68 (67,33)	0,467*	0,924*	0,484*

of sensitization to AG, which was detected in 73 individuals (61.34%, 95 % CI: 0.52; 0.69) with mild, in 79 individuals (64.23%, 95 % CI: 0.55, 0.72) with moderate and 68 individuals (67.33% 95 % CI: 0.57, 0.75) with severe asthma, respectively.

Thus, the determination of sensitization in patients with AR and asthma has the great scientific and practical importance because it allows us to obtain reliable information about the character of etiology, significant hypersensitivity, contributes to the early diagnosis and improvement methods provide treatment and preventive care for patients with AS.

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## Conclusions

1. The main regional etiological factors of PAR are mites AG (78.2% of cases) and SAR — cereal plants (52.24% of cases).
2. By analysis of the the characteristics of pollen sensitization among the patients with SAR in different age groups we found the tendency to the increasing of hypersensitivity to pollen AG with age.
3. Regardless of the severity of asthma in the patients household sensitization was significantly dominated.
4. Regardless of the severity of asthma, almost equally, there multiple sensitization to various AG.

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