

# Analysis of the prevalence of allergic rhinitis among children in Uzhhorod

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## ABSTRACT

**Aim:** To analyze data on the prevalence of allergic rhinitis (AR) among children in Uzhhorod.

**Materials and Methods:** 373 patients who consulted a pediatric allergist at the Uzhgorod City Children's Polyclinic were under observation.

**Results:** After examination of 373 patients with AR, it was found that girls predominated by gender, namely 54.7%, against 45.3% boys. In the age structure, younger preschool age prevailed - 32.5%. Aggravated heredity, namely the presence of allergies, bronchial asthma and atopic dermatitis (AD) in parents was found in a total of 78.1%. Of them, the presence of burdened heredity in both parents was found in 29.3%, in one of the parents - 48.7%.

Analyzing the features of the clinical course of AR, it was established that the vast majority of patients were diagnosed with persistent AR, namely 53.4%, against intermittent AR in 46.6%. According to the data of VAS, the clinical course of AR was characterized by a moderate or severe course, with the greatest severity in the group of primary school age, namely  $7.6 \pm 2.1$  points.

**Conclusions:** The highest prevalence of AR is noted in the age group of primary school age in 32.5% of patients. According to the clinical course of AR, persistent AR prevails in 53.4% of patients.

**KEY WORDS:** allergic rhinitis, prevalence, children, comorbidity

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## INTRODUCTION

According to the European Academy of Allergology and Clinical Immunology (EAACI), allergy is the most common chronic disease in Europe [1]. According to the prognosis of the World Health Organization (WHO), during the 21st century, allergic diseases will take second place, after to mental diseases in terms of prevalence in the world [2]. Today, this pathology represents a global medical and social problem, because up to 40% of the Earth's population has allergic diseases, among the children's population up to 15% [3]. In Ukraine, according to statistics, 10-15% of the population suffers from allergic diseases, which is significantly less than the world indicators [4].

One of the most widespread are respiratory allergic diseases, among which bronchial asthma and allergic rhinitis (AR) are the most common [5].

According to the WHO, the prevalence of seasonal AR in different countries of the world varies from 1 to 40%, year-round - from 1 to 18% [6].

AR does not threaten the life of the patient, but affects its aspects, in particular, social, mental, physical (reduced work capacity, reduced productivity, impaired

cognitive function, impaired learning, increased fatigue, disturbed sleep), and is also a risk factor for the development of bronchial asthma and in 43-64% of cases it precedes its development [7].

According to ARIA, the prevalence of spontaneous AR allergic rhinitis is 2% to 25% in children and 1% to 40% in adults. The prevalence of confirmed allergic rhinitis in adults in European countries ranges from 17% to 28.5% [8].

According to official statistics in Ukraine, the highest prevalence rates of allergic rhinitis were registered in Dnipro - 596.0 and Kharkiv - 398.6 regions. The lowest prevalence rates of the studied pathology were registered in the Volyn region - 78.5 per 100,000 adult population. The overall prevalence rate of AR in Ukraine is 267.3 per 100,000 adult population, which is only 0.3% of the total population (the prevalence of this pathology among children over the past 10 years in Ukraine is 0.5%) [9]. The given data of official statistics on the prevalence of AR indicate the underdiagnosis of this pathology [10].

Therefore, the study of the true prevalence of AR and its clinical features is relevant.

**Table 1.** Distribution of AR patients by age and gender

Age groups	The total number of patients n=373		Boys n=169		Girls n=204	
	Abs.	%	Abs.	%	Abs.	%
1-2 years	52	13,9	28	7,5	24	6,5
3-6 years	90	24,1	42	11,2	48	12,9
7-11 years	121	32,5	48	12,9	73	19,5
12-18 years	110	29,5	51	13,7	59	15,8
The total number of patients	373	100	169	45,3	204	54,7

## AIM

The aim was to analyze data on the prevalence of allergic rhinitis (AR) among children in Uzhhorod.

## MATERIALS AND METHODS

Under observation were 373 patients who consulted a pediatric allergist at the Uzhhorod Children's Polyclinic with a diagnosis of AR for 2023 year. The studies were conducted with the informed consent of the patients, and their methodology was in accordance with the Helsinki Declaration of 1975 and it was revised in 1983 and approved by the UzhNU local bioethics commission (Protocol No. 7/10 dated May 18, 2024).

The diagnosis of AR was established according to the recommendations of the Unified Clinical Protocol of Primary, Secondary and Tertiary Care «Allergic Rhinitis» (2019) and EAACI recommendations (2022) [11].

The research was conducted by means of a questionnaire using a special questionnaire to identify AR symptoms [12]. To assess the severity of symptoms, a visual analog scale (VAS) was used, where 0 is the worst condition and 10 is the best condition [13].

Only verified diagnoses and consultation data of related specialists were taken into account. Data analysis was performed using Janovi version 2.3.28. Means, standard errors, and significance of differences were calculated and considered statistically significant at  $p < 0.05$ .

## RESULTS

After examination of 373 patients with AR, it was found that girls predominated by gender, namely 54.7% (204 out of 373), against 45.3% boys (169 out of 373), which indicates a greater prevalence of this pathology among the female.

In the age structure, younger preschool age prevailed -32.5% (121 out of 373), the next most common was high school age - 29.5% (110 out of 373), the third - preschool age - 24.1% (90 out of 373), and the smallest was before preschool age - 13.9% (52 out of 373) (table 1).

Aggravated heredity, namely, the presence of allergies

(food and inhalation), bronchial asthma and atopic dermatitis (AD) in parents, in general, was found in 78.1% (291 out of 373). Of them, the presence of burdened heredity in both parents was found in 29.3% (109 out of 373), in one parent -48.7% (182 out of 373). The absence of aggravating heredity was noted in 21.9% (82 out of 373).

At the next stage of the study, the peculiarities of the course of AR in age groups and its influence on the quality of life according to VAS were studied.

Analyzing the features of the clinical course of AR, it was established that the vast majority of patients were diagnosed with persistent AR, namely 53.4% (199 out of 373), against intermittent AR in 46.6% (174 out of 373) (table 2).

According to VAS data, the clinical course of AR was characterized by a moderate or severe course, the highest severity in the group of primary school age, namely  $7.6 \pm 2.1$  points (table 3).

Also, among this sample of patients, an analysis of the frequency of concomitant pathology was conducted (Table 4).

Therefore, the results of the study indicate that the most frequent concomitant diseases were AD and bronchial asthma, the third most frequent concomitant condition was allergic conjunctivitis (AK).

## DISCUSSION

Therefore, the revealed data regarding the higher prevalence of AR among women coincide with the data of a study by Hungarian scientists (2020) regarding the prevalence of AR among children [14].

The actual data on the distribution of AR in the age structure, which were observed in persons aged 1 to 18 years inclusive, had an obvious tendency to increase until primary school age, with a subsequent decrease, which can be explained by the age-related features of immunity, the influence of sex hormones on the immunological mechanisms of occurrence and course AR, as well as the nature of the treatment given to these patients. The obtained data complement the work of

**Table 2.** Distribution of the clinical course of AR in different age groups

Age groups	Clinical course			
	Intermittent		Persisting	
	abs.	%	abs.	%
1-2 years	12	3,2	40	10,8
3-6 years	30	8,0	60	16,0
7-11 years	62	16,7	59	15,8
12-18 years	70	18,7	40	10,8
The total number of patients	174	46,6	199	53,4

**Table 3.** Indicators of VAS in different age groups

Age groups	Indicators of VAS
1-2 years	6,7±1,8*
3-6 years	6,3±2,4*
7-11 years	7,6±2,1*
12-18 years	5,1±1,7*

Note. Difference validity: \* –  $p > 0,05$ .

foreign scientists SN Hong et al. on the distribution of AR among children [15].

The obtained results regarding the presence of burdened heredity only confirm many years of research by scientists regarding the significant influence of heredity on the development of allergic diseases in children [16].

The obtained data on the clinical course of AR are probably related to the prevalence of the causative allergens that cause AR, because according to the data of many population studies, the most frequent allergens that cause allergic diseases among children are house dust mites, which in turn will cause complaints in patients throughout the year [4,5].

The obtained results for VAS are probably related to the peculiarities of the immune system in children, which can be excessively activated in response to allergens, which leads to more severe manifestations of allergies. As well as frequent infections of the upper respiratory tract, which can complicate the course of

allergic rhinitis and lead to chronic inflammation with a high level of morbidity in this category of patients with various ARVs, which aggravates the symptoms of allergic diseases. The obtained data coincide with the data of scientists, who also associate the more severe course of AR with the peculiarities of the immune response in children at different age periods [17].

The data obtained regarding the presence of concomitant pathology in patients with AR only confirm the long-term studies of scientists from around the world [18,19], according to which the most common concomitant conditions in AR are bronchial asthma and AD. Allergic rhinitis, bronchial asthma and atopic dermatitis often occur together due to common development mechanisms that are associated with hyperactivity of the immune system. The main cause is atopy — the body's genetic predisposition to an excessive immune response to common irritants (allergens). These conditions often develop in a complex due to the so-called «atopic march» - a gradual transition of one disease to another, which begins with atopic dermatitis in childhood, continues with allergic rhinitis and can lead to asthma.

## CONCLUSIONS

1. The highest prevalence of AR is noted in the age group of primary school age in 32.5% of patients.

**Table 4.** Prevalence of concomitant pathology in patients with AR in different age groups

Nosology	Age groups								Total number	
	1-2 years		3-6 years		7-11 years		12-18 years		abs.	%
	abs.	%	abs.	%	abs.	%	abs.	%		
Bronchial asthma	0	0	35	9,4	54	14,4	58	15,5	112	30,0
Atopic dermatitis	42	8,6	48	10,1	49	10,5	40	10,7	179	48,0
Allergic conjunctivitis	0	0	10	2,7	15	4,0	14	3,7	30	8,0
Vasomotor rhinitis	0	0	5	1,3	11	2,9	7	1,8	23	6,2
Narrowing of the nasal passages	5	1,3	4	1	2	0,5	0	0	11	3,0
Chronic adenoiditis	6	1,6	10	2,6	4	1	0	0	17	9,0

2. According to the clinical course of AR, persistent AR prevails in 53.4% of patients.
3. The most frequent comorbid conditions in RA are atopic dermatitis and bronchial asthma.

## PROSPECTS FOR FURTHER RESEARCH

Study of the prevalence of AR, features of its clinical course among different age groups of the population.

## REFERENCES

1. Jutel M, Agache I, Zemelka-Wiacek M et al. Nomenclature of allergic diseases and hypersensitivity reactions: Adapted to modern needs: An EAACI position paper. *Allergy*. 2023;78(11):2851–74. doi: 10.1111/all.15889. DOI
2. Gilaberte Y, Pérez-Gilaberte JB, Poblador-Plou B et al. Prevalence and comorbidity of atopic dermatitis in children: a large-scale population study based on real-world data. *J Clin Med*. 2020;9(6):1632–37. doi: 10.3390/jcm9061632. DOI
3. Achilova DN, Yomgurova OR. Clinical-immunological and medico-Social aspects of allergic diseases in children, development of criteria for early diagnosis and prognosis of the course of the disease (literature review). *Br Med J*. 2022;2(2):45–49.
4. Chernukha OV, Borysova AI, Reva KO. Poshyrenist, perebih, profilaktyka alerhii sered naselennia Ukrainy v XXI stolitti. [Prevalence, course, and prevention of allergy among the population of Ukraine in the xix century]. The 12 th International scientific and practical conference “Innovations and prospects in modern science”(November 20–22, 2023) SSPG Publish, Stockholm, Sweden 2023, p.912. (Ukrainian).
5. Tenero L, Vaia R, Ferrante G et al. Diagnosis and management of allergic rhinitis in asthmatic children. *J Asthma Allergy*. 2023;3(2):45–57.
6. Jalolov NN, Rahmatjonov KA et al. Immunotherapy for seasonal and perennial allergic rhinitis. *E Conference Zone*. 2023, pp. 36–44.
7. Bousquet J, Akdis CA, Jutel M et al. Intranasal corticosteroids in allergic rhinitis in COVID-19 infected patients: An ARIA-EAACI statement. *Allergy*. 2020;75(10):2440–4. doi:10.1111/all.14302. DOI
8. He W-F, Si D-X, Yan Y et al. Systematic review and Meta-analysis of Peitu Shengjin prescription versus H 1 antihistamine in the treatment of allergic rhinitis. *J Hainan Med Univ*. 2021;27(15):243–46. doi: 10.1016/j.bjorl.2023.03.009. DOI
9. Klymenko VA, Karpushenko YuV, Kulik TV, Ashcheulov OM. Vedennia khvoroho na alerhichniy rynit v Ukraini: mizhnarodni rekomendatsii ta vlasnyi dosvid. [Management of a patient with allergic rhinitis in Ukraine: international recommendations and own experience]. *Astma ta alerhiya*. 2022;3:33–40. (Ukrainian)
10. Nugmanova D, Feshchenko Yu, Kheday Ye et al. The Prevalence of Allergic Rhinitis, its Triggers, and Associated Factors in Commonwealth of Independent States Countries (Ukraine, Kazakhstan, and Azerbaijan): Results of the CORE Study. *Dubai Med J*. 2021;4(2):81–92. doi:10.1159/000514318. DOI
11. Bousquet J, Anto JM, Bachert C et al. Allergic rhinitis. *Nat Rev Dis Prim*. 2020;6(1):95. doi:10.3389/falgy.2021.721851. DOI
12. Snoring Source. Home - Snoring Source. <https://www.snoring-source.com/> [Accessed 08 April 2024]
13. Cheng LJ, Tan RL-Y, Luo N. Measurement properties of the EQ VAS around the globe: a systematic review and meta-regression analysis. *Value Heal*. 2021;24(8):1223–33. doi:10.1016/j.jval.2021.02.003. DOI
14. Sultész M, Horváth A, Molnár D et al. Prevalence of allergic rhinitis, related comorbidities and risk factors in schoolchildren. *Allergy, Asthma & Clin Immunol*. 2020;16:1–11. doi:10.1186/s13223-020-00495-1. DOI
15. Hong S-N, Won JY, Nam E-C et al. Clinical manifestations of allergic rhinitis by age and gender: a 12-year single-center study. *Ann Otol Rhinol & Laryngol*. 2020;129(9):910–7. doi:10.1177/0003489420921197. DOI
16. Kabesch M, Tost J. Recent findings in the genetics and epigenetics of asthma and allergy. *Seminars in immunopathology*. 2020;42:43–60.
17. Ogulur I, Pat Y, Ardıclı O et al. Advances and highlights in biomarkers of allergic diseases. *Allergy*. 2021;76(12):3659–86. doi:10.1111/all.15089. DOI
18. Nappi E, Paoletti G, Malvezzi L et al. Comorbid allergic rhinitis and asthma: important clinical considerations. *Expert Rev Clin Immunol*. 2022;18(7):747–58. doi:10.1080/1744666X.2022.2089654. DOI
19. Bekić S, Martinek V, Talapko J et al. Atopic dermatitis and comorbidity. In: *Healthcare*. 2020, p. 70.

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## CONFLICT OF INTEREST

The Authors declare no conflict of interest

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