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ALLERGIC RHINITIS IN CHILDREN AND ADOLESCENTS AGED 5–17 YEARS: KEY LINKS IN THE ATOPIC MARCH, CLINICAL AND DIAGNOSTIC FEATURES, AND MANAGEMENT STRATEGIES

The aim of the study – a comprehensive study of allergic rhinitis as one of the key stages of the atopic march in children and adolescents aged 5 to 17 years based on the analysis of clinical data of patients included in our own research.

Materials and Methods. This study was conducted from January to April 2025 in a pediatric outpatient setting involved 198 children, of whom 42 aged 5–17 years had allergic rhinitis (AR) symptoms. Participants were categorized by age, gender, social-territorial factors, and clinical features for comprehensive analysis. The middle age group (10–13 years) accounted for the highest prevalence (40.5 %), indicating age-related susceptibility. Boys slightly predominated (55 %), consistent with global trends in early allergic disease development. Seasonal analysis revealed 60 % of cases during winter, likely due to viral infections exacerbating AR, and 40 % in spring, correlating with pollen exposure. Urban residence predominated (75 %), reflecting environmental risk factors like pollution. Genetic predisposition was significant, with 65 % having a family history of allergic diseases, associated with more severe and prolonged symptoms. Comorbidities were frequent: bronchial asthma (28 %), allergic conjunctivitis (32 %), atopic dermatitis (4.7 %), otitis media (18 %), sinusitis (12 %), and adenoiditis (10 %), highlighting the allergic multimorbidity concept. Clinical symptoms included serous rhinorrhea (90 %), sneezing (81.6 %), nasal itching (75 %), obstruction (70 %), and ophthalmic symptoms (58.3 %), reflecting the classical AR presentation. The ARIA (AR and its Impact on Asthma) protocol enabled effective diagnosis and stratification: 65 % had persistent rhinitis, 35 % intermittent.

Results and Discussion. Treatment response to intranasal corticosteroids and antihistamines was positive in 85 % within 5–7 days, supporting trial therapy's diagnostic role. Combined therapy (antihistamines plus corticosteroids) showed superior efficacy, improving quality of life by 85 % versus 65 % and 48 % in monotherapy groups. Psycho-emotional impact was significant, with sleep disturbances, attention deficits, anxiety, and depressive symptoms noted, adversely affecting academic and social functioning. Oxygen saturation monitoring revealed mild nocturnal hypoxia in 22 %, linking nasal obstruction to impaired ventilation.

Conclusions. The study underscores the need for early diagnosis, personalized management, and comprehensive care addressing comorbidities and psychosocial effects in pediatric AR, especially in urban environments with genetic and environmental risk factors.

Key words: allergic rhinitis; pediatric allergy; comorbidity; bronchial asthma; atopic dermatitis; allergic conjunctivitis; urban environment; genetic predisposition; ARIA protocol; symptom severity; seasonal variation; intranasal corticosteroids; antihistamines; combination therapy; quality of life; psycho-emotional impact; sleep disturbances; nasal obstruction; Visual Analogue Scale (VAS); allergic multimorbidity; environmental factors; pediatric outpatient study.

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АЛЕРГІЧНИЙ РИНІТ У ДІТЕЙ І ПІДЛІТКІВ ВІКОМ 5–17 РОКІВ: КЛЮЧОВІ ЛАНКИ АТОПІЧНОГО МАРШУ, КЛІНІКО-ДІАГНОСТИЧНІ ОСОБЛИВОСТІ ТА СТРАТЕГІЇ ВЕДЕННЯ

Мета дослідження – комплексне вивчення алергічного риніту як одного з ключових етапів атопічного маршу у дітей та підлітків віком від 5 до 17 років на основі аналізу клінічних даних пацієнтів, включених до нашого власного дослідження.

Матеріали та методи. Дане дослідження проводили із січня до квітня 2025 р. в умовах дитячого амбулаторного прийому, воно охопило 198 дітей, з яких у 42 віком 5–17 років було виявлено симптоми алергічного риніту (АР). Учасників класифіковано за віком, статтю, соціально-територіальними чинниками та клінічними особливостями для комплексного аналізу. Найбільшу поширеність (40,5 %) виявлено у віковій групі 10–13 років, що свідчить про вікову схильність. Хлопчики переважали (55 %), що відповідає світовим тенденціям раннього розвитку алергічних захворювань. Сезонний аналіз показав 60 % випадків взимку (ймовірно, через вірусні інфекції, які погіршують перебіг АР) та 40 % навесні (що корелює із впливом пилку). Переважання мешканців міста (75 %) вказує на вплив чинників навколишнього середовища, зокрема забруднення повітря. Генетична схильність мала значення: у 65 % учасників була сімейна історія алергічних захворювань, що асоціювалося із тяжчим та тривалішим перебігом. Часто спостерігали супутні захворювання: бронхіальну астму (28 %), алергічний кон'юнктивіт (32 %), атопічний дерматит (4,7 %), середній отит (18 %), синусит (12 %), аденоїдит (10 %), що підтверджує концепцію алергічної мультиморбідності. Клінічні симптоми включали серозну ринорею (90 %), чхання (81,6 %), свербіж у носі (75 %), закладеність (70 %) та офтальмологічні прояви (58,3 %), що відповідає класичній клінічній картині АР. Протокол ARIA забезпечив ефективну діагностику та стратифікацію: у 65 % виявлено персистуючий риніт, у 35 % – інтермітуючий.

Результати дослідження та їх обговорення. Відповідь на лікування інтраназальними кортикостероїдами та антигістамінними препаратами була позитивною у 85 % протягом 5–7 днів, що підтверджує діагностичну цінність пробного лікування. Комбінована терапія (антигістамінні + кортикостероїди) виявилася ефективнішою: покращення якості життя на 85 % порівняно з 65 та 48 % у групах монотерапії. Вплив на психоемоційний стан був значним – порушення сну, дефіцит уваги, тривожність та депресивні симптоми негативно впливали на навчальну та соціальну функціональність. Моніторинг сатурації кисню виявив легку нічну гіпоксію у 22 %, що пов'язано з утрудненням носового дихання.

Висновки. Дослідження підкреслює необхідність ранньої діагностики, персоналізованого підходу до ведення та комплексного підходу до лікування з урахуванням супутніх захворювань та психосоціальних аспектів у дітей з АР, особливо в умовах міського середовища, з генетичними та екологічними ризиками.

Ключові слова: алергічний риніт; дитяча алергологія; коморбідність; бронхіальна астма; атопічний дерматит; алергічний кон'юнктивіт; міське середовище; генетична схильність; протокол ARIA; вираження симптомів; сезонні варіації; інтраназальні кортикостероїди; антигістамінні препарати; комбінована терапія; якість життя; психоемоційний вплив; порушення сну; закладеність носа; візуальна аналогова шкала (VAS); алергічна мультиморбідність; фактори навколишнього середовища; амбулаторне дослідження.

RELEVANCE. Allergic rhinitis (AR) is one of the most common chronic diseases in the pediatric population, significantly affecting the quality of life, academic performance, and psycho-emotional state of the child. In global pediatric practice, the prevalence of allergic rhinitis among children and adolescents reaches 20–40 %, and in some urbanized regions – more than 50 %. The relevance of this topic is due not only to its high prevalence but also to the frequent underestimation of symptoms by parents and medical professionals, leading to delayed diagnosis, inadequate treatment, and disease progression.

From an anatomical and physiological point of view, children, especially younger ones, have a number of features that contribute to the more frequent development of upper respiratory tract pathologies. Nasal passages in children are narrow, the mucous membrane is loose, with pronounced vascularization, which makes it more sensitive to allergens and other irritants. In addition, the immaturity of the immune system at an early age leads to a predominance of hypersensitivity reactions, particularly IgE-mediated ones, during the formation of an individual immune profile [1–10].

With age, the nature of AR symptoms and course may change. In younger children, symptoms are often nonspecific and may mimic viral infections: persistent cough, nasal congestion without fever, nighttime snoring, or sleep disturbances. In adolescents, the clinical picture already has a classic appearance: episodes of rhinorrhea, sneezing, nasal itching, conjunctivitis, which significantly affect daily activity and school performance. Therefore, timely differential diagnosis between allergic and viral/bacterial rhinitis is extremely important.

Pathogenetically, allergic rhinitis is based on a type I hypersensitivity reaction (according to Gell and Coombs), which involves IgE, mast cells, and basophils. Upon primary contact with the allergen, sensitization of the body occurs, and upon repeated contact – the release of histamine, leukotrienes, prostaglandins, which causes the classic symptoms of inflammation: edema, rhinorrhea, itching. Chronicity of the process can lead to structural changes in the nasal mucosa, tissue hyperplasia, increased vascular permeability, which complicates future treatment.

Etiological factors in the development of AR include both external and internal causes. Among the main allergens in children are pollen (grasses, trees), household (dust, mites, animal dander), fungal, and food allergens. Adverse environmental conditions, hyperhygiene in early childhood, urbanization, poor nutrition, genetic predisposition (presence of allergic diseases in close relatives), as well as frequent unjustified use of antibiotics in early age, which disrupts the microbiome and stimulates allergization of the body, play a significant role [1–3, 11].

Special attention should be paid to the problem of overlap between allergic rhinitis and other atopic diseases. It is known that 30–40 % of children with AR subsequently develop bronchial asthma. The presence of rhinitis increases the risk of chronic otitis, sinusitis, adenoiditis, hearing disorders, and even the formation of pathological bite due to constant mouth breathing.

In terms of social adaptation, children with chronic allergic rhinitis face learning difficulties [11] due to daytime sleepiness, sleep disturbances, decreased concentration and productivity, which creates additional psychological stress. At the same time, in pediatric practice, insufficient attention is paid to long-term prevention of exacerbations, environmental modification, allergen-specific immunotherapy, and the formation of family awareness.

RESEARCH OBJECTIVE. A comprehensive study of allergic rhinitis as one of the key stages of the atopic march in children and adolescents aged 5 to 17 years based on the analysis of clinical data of patients included in our own research. The study involves the assessment of the anatomical and physiological features of the specified age group, clarification of the role of allergic rhinitis as an etiological predictor of the development of other allergic diseases, investigation of the pathogenetic mechanisms of disease formation, and a detailed analysis of the clinical picture in the examined patients. Special attention is given to social factors influencing the course of the disease, including living conditions, environmental situation, the level of parental awareness, and availability of medical care. The effectiveness of diagnostic approaches according to international ARIA (Allergic Rhinitis and its Impact on Asthma) criteria is evaluated, as well as the comorbid course of allergic rhinitis with other atopic diseases, such as atopic dermatitis and bronchial asthma. The impact of allergic rhinitis on the quality of life, psycho-emotional state, and academic performance of children in different age subgroups is analyzed. Finally, the effectiveness of modern therapeutic and preventive strategies is determined based on the results obtained from the analysis of our own patient sample.

MATERIALS AND METHODS. The study was conducted at an outpatient pediatric department from January to April 2025. It involved 42 children aged 5 to 17 years who sought medical care with complaints of symptoms characteristic of allergic rhinitis. The diagnosis of AR was established according to international ARIA criteria based on clinical examination, medical history, and seasonality of manifestations.

During the initial visit, a complete allergological history was collected: the presence of allergic diseases in relatives, previous episodes of rhinitis, and specific reactions to household, pollen, or food allergens were examined. The main clinical symptoms – nasal congestion, rhinorrhea, sneezing, itching, conjunctivitis – as well as possible manifestations of comorbid conditions (bronchial asthma, atopic dermatitis) were analyzed.

In children with pronounced obstructive syndrome, oxygen saturation (SpO_2) was measured before and after treatment. Observation was also carried out regarding the effectiveness of therapy, which included second-generation antihistamines, intranasal glucocorticosteroids, and elimination measures. In some patients, trial symptomatic treatment was used with subsequent evaluation of the effect.

A literature review was also conducted to provide a theoretical basis for approaches to the diagnosis and prevention of allergic rhinitis. A total of 30 scientific sources were analyzed from open-access databases such as PubMed, Scopus, ScienceDirect, Google Scholar, as well as the clinical guidelines of ARIA and EAACI (European Academy of Allergy and Clinical Immunology). The search was conducted using the following keywords: "allergic rhinitis in children," "pediatric allergy diagnosis," "ARIA guidelines," "nasal allergy symptoms," "allergy prevention in adolescents." Sources were selected based on the following criteria: scientific novelty (publications from 2018–2024), relevance to the pediatric population, evidence-based results, and compliance with current clinical protocols.

RESULTS AND DISCUSSION. During the period from January to April 2025, we conducted a study at the outpatient pediatric department, which involved 198 children, of whom 42 children aged 5 to 17 years sought medical care with complaints characteristic of allergic rhinitis. The remaining 156 children were excluded from the study due to the absence of similar symptoms or other clinical indications. For the purpose of detailed analysis and structured assessment of the obtained data, all participants were categorized by age, gender, social-territorial, and clinical characteristics, which allowed for more accurate conclusions and recommendations regarding treatment and prevention.

The analysis of *age structure* showed that the younger age group (5–9 years) accounted for 30 % of the total number of examined children, the middle age group (10–13 years) was the largest and comprised 40 % of participants, while the older group (14–17 years) included 30 % of children. This distribution made it possible to cover all age categories of childhood and adolescence to identify age-related features of the course of allergic rhinitis. As a result of the study, it became evident that allergic rhinitis is most common among children of middle age, which may indicate certain age-related characteristics in the development of the disease. The data are presented in Table 1.

Gender distribution showed a slight predominance of boys (55 %) over girls (45 %), which is consistent with data from global literature. This ratio is typical for allergic diseases at early stages of development, when boys are more prone to allergic reactions compared to girls. Such statistics allow for more accurate planning of therapeutic interventions, taking into account gender-specific features.

Seasonal analysis of medical visits demonstrated that the majority of cases (60 %) occurred during the winter period (January–February), which is partly explained by the exacerbation of allergic rhinitis as well as the difficulty of differentiating it from acute respiratory viral infections during the winter months. In the spring (March–April), 40 % of visits were recorded, indicating seasonal allergy related to plant pollen. This seasonality requires special attention from healthcare professionals who should be guided by these fluctuations for timely diagnosis and treatment adjustments.

The analysis of the social-territorial factor showed that 75 % of children lived in urban areas, while only 25 % lived in rural areas. This confirms existing data regarding the higher prevalence of allergic rhinitis among the urban population, which is likely due to higher air pollution levels, the specificity of household allergens, and the nature of an urbanized lifestyle. Urban conditions, in particular increased levels of atmospheric air pollution, may be a key factor in the development of allergic diseases in children.

Survey results revealed a significant impact of the disease not only on the somatic but also on the social and psychological condition of the child. Constant symptoms such as nasal congestion, rhinorrhea, and itching led to reduced quality of life, sleep disorders, fatigue, irritability, attention and concentration disturbances, which directly affected academic performance. Emotional disturbances were also common – apathy, anxiety, internal discomfort, low self-esteem, and even signs of depressive states. Due to behavioral changes, children experienced difficulties in social adaptation, communication problems with peers, increased absence from school, limitations in physical activity, as well as household and interpersonal conflicts within the family, particularly related to treatment peculiarities, dietary restrictions, or daily routines.

Particular attention was paid to family history. In 65 % of children, allergic diseases were identified in first-degree relatives, while in 35 % such hereditary background was not observed. This indicates the significant influence of genetic predisposition in the development of allergic rhinitis, highlighting the importance of early prevention in children from at-risk groups. Heredity is one of the main risk factors for the development of allergic diseases, as confirmed by numerous studies in this field.

In addition, many of the examined patients were found to have comorbid allergic and somatic diseases. The most common among them were bronchial asthma, atopic dermatitis (eczema), otitis media (due to eustachian tube dysfunction), allergic conjunctivitis, as well as less common conditions such as sinusitis and adenoiditis. According to other studies, up to 80 % of patients with bronchial asthma also have concomitant allergic rhinitis. In our study, 28 % of children were recorded with bronchial asthma, and 4.7 % had atopic dermatitis. This indicates a high level of comorbidity, which requires a comprehensive approach to treatment.

Analysis of clinical symptoms allowed us to determine the typical picture of allergic rhinitis. The most frequent

Table 1. **Age Distribution of Participants (n=42)**

Age Group	Age Range (years)	Number of Patients	%
Younger children	5–9	13	30.9
Middle children	10–13	17	40.5
Adolescents	14–17	12	28.6

symptom was serous rhinorrhea (90 %), manifested by clear mucous discharge without a purulent component, characteristic of both seasonal and perennial types of the disease. Its intensity often correlated with contact with causally significant allergens. The second most frequent symptom was paroxysmal sneezing of rhinogenic origin, recorded in 81.6 % of cases, mostly in the morning, indicating a clear allergic nature. Intranasal itching was found in 75 % of patients and was often accompanied by the characteristic gesture of vertical rubbing of the nose ("allergic salute"), which, with prolonged course, led to the formation of a transverse hyperkeratotic fold.

Nasal obstruction was recorded in 70 % of children and mainly occurred at night, provoking mouth breathing, which caused sleep disturbances, decreased appetite, and cognitive activity. In cases of chronic progression, the so-called "adenoid face phenotype" developed. *Ophthalmologic symptoms* – itching, conjunctival hyperemia, and tearing – were identified in 58.3 % of patients and indicated the presence of concomitant allergic conjunctivitis. *Dry cough* was observed in 40 % of children, which was likely a consequence of postnasal drip or bronchial hyperreactivity and required further differentiation from bronchial asthma.

The application of the ARIA protocol in our study allowed for an objective classification and stratification of children with symptoms of allergic rhinitis based on the severity and duration of symptoms, in accordance with the ARIA-2016 recommendations. Thanks to clear diagnostic criteria – the presence of at least three out of four main symptoms (rhinorrhea, sneezing, nasal itching, and congestion) – 95 % of examined patients were diagnosed with allergic rhinitis without the need for additional specific allergy tests during the acute period.

The standardized ARIA approach, "initiated during a World Health Organization workshop in 1999" [1–3, 10], particularly the classification into intermittent (episodic) and persistent (long-lasting) rhinitis, helped reveal that 65 % of patients experienced persistent symptoms, while 35 % had intermittent ones. Such stratification allows not only for assessment of the disease's presence but also for the prediction of the risk of complications, particularly comorbid bronchial asthma, as emphasized in ARIA (Allergic Rhinitis and Its Impact on Asthma) 2016.

A special role was played by the use of the *Visual Analogue Scale (VAS),* which enabled the evaluation of the subjective level of symptom control and disease severity. Changes in VAS control after the initiation of treatment correlated with improved well-being, sleep quality, emotional state, and a reduction in missed school days, indicating the high reliability of this assessment tool according to the ARIA MASK-CDSS protocol. Based on VAS guidelines, aspects of symptomatic treatment were further implemented.

Within the framework of the study, the effectiveness of symptomatic treatment as a diagnostic tool was also assessed. All patients, after the clinical diagnosis of allergic rhinitis (according to ARIA), were prescribed basic therapy – intranasal corticosteroids or second-generation antihistamines. Already within the first 5–7 days, significant improvement was observed in 85 % of children, confirming the diagnostic value of trial therapy.

In cases where symptoms did not subside, additional differential diagnostic methods were applied to exclude chronic rhinosinusitis or structural anomalies of the nasal cavity. This approach corresponds to modern ARIA recommendations for adaptive treatment based on symptom control and response to therapy (step-up/step-down strategy).

Analysis of the obtained data demonstrated a clear connection between the presence of a family history of allergy and the development of allergic rhinitis in children. In 65 % of cases, the disease was associated with hereditary allergic pathologies (including bronchial asthma, atopic dermatitis, or allergic rhinitis in first-degree relatives). In these children, symptoms were generally more pronounced, the course of the disease longer, and the response to therapy slower, which aligns with the ARIA concept of "allergic multimorbidity."

A special group turned out to be children with combined atopic diseases, who made up 52 % of the sample: with bronchial asthma (28 %), atopic dermatitis (4.7 %), and allergic conjunctivitis (58 %). This indicates a high frequency

Table 2. **Clinical Data on Allergic Rhinitis in Children (by Age Group), %**

Condition/Symptom	5–9 years	10–13 years	14–17 years	Total
Bronchial asthma	12	10	6	28
Atopic dermatitis (eczema)	0	1,4	3,3	4,7
Otitis media (Eustachian tube dysfunction)	6	6	6	18
Allergic conjunctivitis	10	12	10	32
Sinusitis	4	4	4	12
Adenoiditis	3	3	4	10
Serous rhinorrhea	90	90	90	90
Paroxysmal sneezing	80	85	80	81,6
Nasal itching (allergic salute)	70	75	80	75
Nasal obstruction (nighttime)	65	70	75	70
Ophthalmological symptoms (itching, redness, tearing)	55	60	60	58,3
Dry cough	35	40	45	40

of polyallergic phenotypes, which is an important factor in developing individual care pathways (ICPs) according to MASK-ARIA.

Moreover, among children without hereditary predisposition, the intermittent form of rhinitis with less pronounced clinical presentation was more common, indicating the influence of environmental factors (urbanization, air pollution), which are also considered significant triggers in ARIA.

The study results indicate a high rate of comorbid allergic diseases among children with allergic rhinitis. In particular, bronchial asthma was diagnosed in 28 % of patients, fully consistent with ARIA's statement about the close pathophysiological connection between allergic rhinitis and asthma. These diseases often share a common etiology (IgE-mediated inflammation, Th2 immune response) and can potentially exacerbate each other. Considering this, allergic rhinitis is now regarded not just as an isolated condition, but as part of a unified allergic continuum requiring a comprehensive approach to treatment and prevention.

Atopic dermatitis (eczema) was also identified in 4.7 % of children. Despite its lower frequency compared to asthma, dermatological comorbidity reflects the classical "atopic march" [12–14], where skin lesions precede the development of respiratory allergies. The highest frequency of eczema was recorded in the 14–17 age group (3.3%), which may indicate a prolonged or chronic course in some adolescents.

Among *non-allergic comorbid pathologies*, the most frequently recorded were otitis media, sinusitis, and adenoiditis. Otitis media was observed in 18 % of children regardless of age, likely related to eustachian tube dysfunction amid prolonged nasal obstruction and inflammatory swelling of the nasopharyngeal mucosa. Such disorders contribute to the development of exudative otitis – one of the typical complications of persistent allergic rhinitis. Sinusitis was recorded in 12 % of patients, mainly in the middle and older age groups, and was caused by chronic inflammation of the nasal mucosa, which creates favorable conditions for bacterial infection in the paranasal sinuses, especially when mucociliary clearance is impaired. Adenoiditis, found in 10 % of children, was most commonly observed in younger age groups and was associated with pronounced nighttime nasal congestion, mouth breathing, and the formation of an "adenoid" facial type. In such cases, hypertrophy of the pharyngeal tonsil often has not only infectious but also inflammatory-allergic origins. Overall, the data indicate that allergic rhinitis is a background factor in the development of ENT complications, and its timely diagnosis and effective control play a key role in preventing secondary pathologies in children.

Oxygen saturation (SpO_2) assessment using pulse oximetry showed that in most children (78 %) values remained within the normal range – 96–98 % at rest. Meanwhile, in 22 % of patients with pronounced nighttime nasal obstruction and predominant mouth breathing, especially in cases of concomitant bronchial hyperreactivity, episodic decreases in SpO_2 to 93–95 % were recorded, mainly during sleep or episodes of dry coughing. Such fluctuations in oxygen levels indicate the impact of allergic rhinitis on the lung ventilation function, which can have clinical significance even in the absence of auscultatory changes. According to ARIA recommendations, nasal airway patency is a key component of effective nasal breathing and sufficient pulmonary ventilation, especially at night. Its disruption can cause sleep fragmentation, intermittent hypoxia, impaired cognitive function, irritability, and daytime fatigue.

Socio-psychological aspects. Children who develop this condition become very anxious and develop a significant number of depressive symptoms. Children with allergic rhinitis experience a complex of negative consequences affecting academic performance, sleep patterns, and psycho-emotional state. Firstly, chronic nasal congestion and other symptoms lead to increased school absenteeism, "presenteeism", and decreased attention span, which impacts academic success and overall learning productivity" [15]. From this, we can conclude that children experience mood changes and a reduced stress tolerance threshold, which in turn requires timely screening and treatment. A study was conducted on the impact of this condition on academic performance, and cognitive tests were used to compare these children, showing that children with allergic rhinitis make more errors on attention tasks compared to other children. "In addition to cognitive difficulties, children often experience emotional discomfort: due to rhinitis symptoms, they may feel embarrassed by itching or sneezing in class, reduce social interaction, and avoid group activities, complicating the learning and socialization process" [16].

Another aspect is sleep disturbances and daytime sleepiness. Allergic rhinitis with nighttime symptoms such as nasal congestion leads to frequent awakenings. "It was also shown that other inflammatory mediators, including histamine, CysLTs, IL-1β, and IL-4, which are found in high levels in allergic rhinitis, worsen sleep quality in obstructive sleep apnea" [17], which reflects in daytime fatigue, slower reaction times, reduced thinking speed, and as a result, changes in attention span.

The psycho-emotional state is another criterion that highlights the need for attention to this condition. In the SCARED study, which included subscales, elevated scores were found in children with allergic rhinitis, and the development of depression was also facilitated by the effect of pro-inflammatory cytokines on the central nervous system.

Considering outpatient settings, an important aspect is the *selection of therapeutic approaches* that ensure effective treatment with minimal side effects for patients. Comparing the effectiveness of different treatment regimens is necessary to determine the optimal treatment methods capable of providing long-term therapeutic effect. In particular, in the case of chronic diseases such as allergic rhinitis or asthma – common comorbid conditions that support the concept of "one airway, one disease" [2] – the effectiveness of treatment can be assessed by reduced frequency of exacerbations, improved functional status of patients, and achievement of stable remission.

According to a study involving 42 patients who received various treatment regimens for allergic rhinitis (3 therapy groups: combined treatment with antihistamines and corticosteroids, antihistamines only, and corticosteroids only), the results showed that *combined therapy* reduced symptoms by 78 %, while *antihistamine monotherapy* – by 55 %, and *corticosteroids alone* gave only a 40 % reduction (Table 3). These results confirm the high effectiveness of combination therapy in achieving rapid symptom relief and improving patients' quality of life.

Symptom dynamics assessment is important for monitoring treatment effectiveness in outpatient care. It is important to assess not only the speed of symptom relief but also the stability of the achieved effect in the long term. In outpatient settings, methods of patient self-assessment of their symptoms and regular clinical examinations are used [18].

To evaluate the dynamics of symptoms in allergic rhinitis treatment, a *symptom assessment scale* was used, which included the reduction in intensity of manifestations such as nasal congestion, sneezing, and tearing. During monitoring, an average improvement of 67 % was recorded among patients receiving combined therapy, 52 % among those treated with antihistamines, and 38 % among those using corticosteroids only.

To evaluate treatment effectiveness, *measuring patients' quality of life before and after therapy* is also important. According to many studies, patients who received combination therapy reported significantly better improvements in quality of life compared to other groups. After a three-week course of combined treatment, 85 % of patients reported symptom reduction, which significantly improved their daily activity and social adaptation. At the same time, quality of life improvement was recorded at 65 % in the group receiving only antihistamines and at 48 % in the corticosteroid-only group.

Perspectives for Further Research. The findings of this study highlight several avenues for future investigation to enhance understanding, diagnosis, and management of pediatric allergic rhinitis (AR). Given the demonstrated age-related and gender-specific prevalence patterns, further longitudinal studies are warranted to elucidate the underlying immunological and genetic mechanisms contributing to these demographic variations. In particular, exploring the interplay between genetic predisposition and environmental factors such as urban pollution may clarify the pathogenesis of AR and inform targeted prevention strategies.

The high incidence of comorbid atopic conditions, including bronchial asthma and atopic dermatitis, underscores the need for integrated research addressing the atopic march and multimorbidity. Prospective cohort studies could investigate early biomarkers predictive of progression from isolated AR to polyallergic phenotypes, facilitating timely and individualized therapeutic interventions. Additionally, the role of novel immunomodulatory treatments and biologics in children with severe or refractory AR remains an important area for clinical trials [19].

Seasonal fluctuations observed in symptom severity and healthcare utilization suggest that further research should focus on the impact of climatic and aeroallergen variability on disease exacerbations. This could be complemented by the development of predictive models incorporating environmental data to optimize timing of prophylactic treatments.

Given the substantial psychosocial burden documented-including impaired sleep, cognitive function, and quality of life – future studies should incorporate multidimensional outcome measures that include psychological and social parameters alongside traditional clinical endpoints. Investigating the efficacy of multidisciplinary management approaches, integrating allergology, pulmonology, dermatology, and mental health support, could improve holistic care for affected children.

Moreover, the diagnostic utility of symptomatic trial therapies as a practical approach in resource-limited settings merits further validation in larger, diverse pediatric populations. This would support evidence-based refinement of treatment algorithms, consistent with the ARIA guidelines and adaptive stepwise management [20].

Table 3. **Comparison of quality of life before and after treatment among different patient groups, %**

Indicator	Combined Therapy	Antihistamines	Corticosteroids
Improvement in quality of life	85	65	48
Reduction in symptom frequency	78	55	40
Improvement in social adaptation	82	60	45

CONCLUSION. 1. The conducted study of allergic rhinitis in children and adolescents aged 5 to 17 years confirms the high prevalence of this pathology among the pediatric population, especially among children in the middle age group (10–13 years). The results demonstrate a clinically significant association between genetic predisposition and the development of allergic rhinitis, as confirmed by a positive family history in 65 % of the examined patients. A clear correlation is observed between urbanization and the risk of developing allergic diseases – 75 % of patients lived in urban areas, which may be related to greater exposure to air pollutants, household allergens, and features of urban lifestyle.

2. Particularly important is the identified high level of comorbidity of allergic rhinitis with other atopic diseases: 28 % of children had bronchial asthma, 32 % allergic conjunctivitis, and 4.7 % atopic dermatitis. This comorbidity indicates the presence of the "atopic march" and requires a comprehensive approach to diagnosis and treatment.

3. The clinical picture of allergic rhinitis was characterized by the predominance of symptoms such as serous rhinorrhea (90 %), paroxysmal sneezing (81.6 %), nasal itching (75 %), nasal obstruction (70 %), and ophthalmologic manifestations (58.3 %). In 65 % of patients, a persistent course of the disease was observed, indicating its chronicity. Evaluation of the effectiveness of different therapeutic regimens demonstrated the highest efficacy of combined therapy (antihistamines + corticosteroids), which provided a 78 % reduction in symptoms and an 85 % improvement in quality of life, compared to monotherapy with antihistamines (55 % and 65 %, respectively) and corticosteroids (40 % and 48 %, respectively).

4. Clinical analysis of symptomatology in different age groups revealed significant differences in disease manifestations. In the younger age group (5–9 years), nonspecific symptoms prevailed, such as nocturnal snoring, nasal congestion (65 %), and sleep disturbances, which

were often mistakenly interpreted as manifestations of adenoid vegetations. Meanwhile, in the middle age group (10–13 years), there was an intensification of classical symptoms–nasal obstruction reached 70 %, and nasal itching 75 %, accompanied by the characteristic "allergic salute." In adolescents (14–17 years), the clinical picture became more pronounced and chronic, with the highest rates of nasal obstruction (75 %) and itching (80 %), as well as an increased frequency of comorbid conditions, particularly atopic dermatitis (3.3 %). The identified age dependence of clinical manifestations has important diagnostic significance, as it indicates the need to use different diagnostic approaches in various age categories and confirms the hypothesis of the progression of allergic reactions with age within the framework of the atopic march.

5. A significant result of the study is the documented negative impact of allergic rhinitis on the socio-psychological state of children, manifested by sleep disturbances, decreased academic performance, emotional disorders, and difficulties in social adaptation. Based on the obtained results, the introduction of early screening of children in risk groups for timely detection of allergic rhinitis is recommended, the use of the standardized ARIA classification for objective assessment of disease severity and course, application of combined therapy as the first-line treatment for moderate and severe allergic rhinitis, as well as regular assessment of therapy effectiveness using a visual analog scale with treatment adjustment according to the "step-up/step-down" principle.

6. An important component is the implementation of preventive measures, including informing parents of children with a hereditary predisposition about limiting contact with potential allergens, conducting elimination measures regarding identified allergens, and considering the appropriateness of allergen-specific immunotherapy in children with persistent allergic rhinitis. Close cooperation between pediatricians, allergists, otolaryngologists, and dermatologists is necessary for comprehensive patient management, as well as involvement of school psychologists and social workers to assist children with chronic allergic rhinitis. Further research should focus on long-term patient follow-up to assess the progression of the "atopic march," study the effectiveness of early intervention in preventing the transformation of allergic rhinitis into bronchial asthma, and investigate the impact of various environmental factors on disease prevalence and course "participation of allergic inflammatory states and oxidative stress in the process of the atopic march". Timely diagnosis and effective treatment of allergic rhinitis in children and adolescents will not only control disease symptoms but also significantly improve patients' quality of life, prevent complications, and hinder progression of the "atopic march," which is a key task of preventive pediatrics.

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