

## ORIGINAL STUDY

# Main epidemiological characteristics of allergic rhinitis

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### ABSTRACT

**OBJECTIVE.** The aim of this study is to point out the main epidemiological characteristics of a widespread disease with great socio-economic significance, such as allergic rhinitis.

**MATERIAL AND METHODS.** By analyzing the available literature, the authors compare and summarize the results of various studies on this subject.

**RESULTS.** The study showed a high incidence of morbidity of allergic rhinitis, with the highest frequency reported in people living in certain areas of Africa, Asia-Pacific region, Eastern Europe, the Middle East, South America and South-East Asia, Central and Western Europe. The population of Bulgaria occupies an intermediate position regarding this distribution. Predilection group is represented by children and adolescents, and in later years the incidence has dropped significantly.

**CONCLUSION.** The incidence of allergic diseases, particularly allergic rhinitis, has been rising constantly since their discovery till today. Probably dictated by the modern working conditions and lifestyle, urbanization, scientific and technological revolution with subsequent industrial pollution are the main factors responsible for this trend. The disease engages the people from all continents, regardless of nationality, gender and age.

**KEYWORDS:** allergic rhinitis, asthma, frequency, epidemiology

## INTRODUCTION

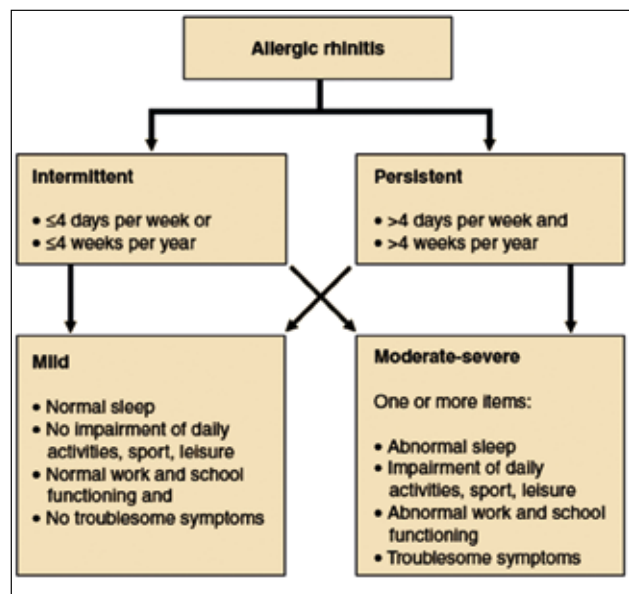
Allergic rhinitis (AR) is a clinical hypersensitivity of the nasal mucosa to foreign substances mediated through IgE antibodies<sup>1</sup>.

Allergic rhinitis and the symptoms of atopy are Th2-mediated diseases. They occur when the balance between Th1/Th2 is disturbed in favour of the Th2 subset. As a result, the immune system responds with hyperergic response to certain antigens - allergens from the environment<sup>2</sup>. For the moment, the predominant trigger mechanism in the response of one subclass Th, resulting in the emergence of various pathological conditions, remains unclear.

After sensitization of the nasal mucosa to an allergen degranulation of the mast cells, subsequent exposure leads to cross-linking of specific immunoglobulin IgE receptors on mast cells that result in degranulation of the mast cells, with the release of inflammatory mediators that are responsible for allergic symptoms<sup>3</sup>. Proinflammatory substances produced by other inflammatory cells are also generated after antigen exposure, among which most prominent are eosinophil products and cytokines<sup>4</sup>. Cytokines generated by lymphocytes, mast cells, and other immunity cells are found in both resting and stimulated nasal mucosa.

## CLASSIFICATION

The last classification of allergic rhinitis divides this disease into two groups<sup>5</sup>: intermittent and persistent (Figure 1):



**Figure 1** Classification of allergic rhinitis by Allergic Rhinitis and its Impact on Asthma (ARIA)

ARIA has reclassified AR as mild/moderate-severe and intermittent/persistent<sup>5</sup>. This classification closely reflects patients' needs and underlines the close relationship between rhinitis and asthma. Patients, clinicians and other health care professionals are confronted with various treatment choices for the management of AR. This contributes to considerable variation in clinical practice; worldwide, patients, clinicians and other health care professionals are faced with uncertainty about the relative merits and downsides of the various treatment options.

The classic symptoms of allergic rhinitis are recurrent episodes of sneezing, rhinorrhea, pruritus, nasal congestion that occur after exposure to the allergen. Itching is the symptom most suggestive of an allergic etiology and also affects the eyes, ears, palate and throat. Rhinorrhea is usually clear and can be anterior, resulting in sniffing and nose blowing, or posterior, resulting in snorting, throat clearing and postnasal drip<sup>6,7,8</sup>.

## THE MAIN EPIDEMIOLOGICAL CHARACTERISTICS OF ALLERGIC RHINITIS

Allergic rhinitis is a global health problem because of its social importance – it affects sleep, decreases the working capacity and ability to education of the children. The disease affects patients of all countries and of all ethnic, social and age groups<sup>9</sup>.

The economic impact of allergic rhinitis is staggering. Based on extrapolation of a 1987 National Medical Expenditure Survey of the overall US population, the direct costs of allergic rhinitis alone, in 1994, were \$US1.15 billion. An additional \$US86 million in indi-

rect costs was due to 811 000 missed days of work, 4 230 000 days of reduced productivity, and 824 000 absentee days from school<sup>10</sup>. In another report, conservative estimates for the direct and indirect costs of hay fever in the overall US population in 1990 were \$US1.8 billion, and these increased to \$US2.7 billion by 1995<sup>11</sup>.

The incidence of atopic diseases is constantly growing in the world. Probably dictated by the scientific and technological revolution, urbanization and modern lifestyles, the incidence of allergic rhinitis and asthma is rising at a constant rate. An increase of prevalence of allergic rhinitis has been observed in the past 40 years, from 6% of the population in 1973 to 18% in 1993<sup>12</sup>.

A much higher prevalence of allergic rhinitis was reported in 1994 by Wright et al.<sup>13</sup> in a longitudinal survey of 747 children living in Tucson, Arizona who had been followed from birth. By 6 years of age, 42% of the children had physician-diagnosed allergic rhinitis.

A few representative studies conducted during the last few years using the International Study of Asthma and Allergies in Childhood (ISAAC) questionnaire confirm the high prevalence rates of allergic rhinitis around the globe. In Brazil, the sinuprevalence of allergic rhinitis in a cohort of 3005 6 to 7-year-olds is 28.8%, and in 3008 13 to 14-year-olds the prevalence is 31.7%<sup>14</sup>. Among school children in the UK, three different ISAAC studies demonstrated prevalence rates for allergic rhinitis of 23.1% in 6 to 7-year-olds, 19.4% in 12 to 14-year-olds, and 28.9% in 13 to 14-year-olds<sup>15-17</sup>.

The map below shows the distribution of continents (Figure 2).



**Figure 2** Prevalence of AR in different regions of the world

This review demonstrates that the prevalence of AR varies greatly within and between Africa, the Asia-Pacific region, Eastern Europe, the Middle East, South America and South East Asia<sup>18</sup>.

In a study of more than 9 000 people in Europe, Bauchau et al.<sup>19</sup> found that the prevalence of subjects with allergic rhinitis, which can be clinically confirmed, ranged from 17% in Italy to 29% in Belgium and the overall distribution of European countries is 23%.

In Bulgaria, Mileva et al.<sup>20</sup>, establishing the frequency of allergic rhinitis - 18.1%, considered two forms of the disease - perennial rhinitis, defined by the presence of perennial runny nose and / or fever in case of temperature, frequency - 10.0%, and seasonal - defined by the presence of fever, repeated seasonally rate - 8.1%<sup>20</sup>.

Belgian general practitioners (GPs) enrolled 804<sup>21</sup> patients who presented with symptoms of AR. In accordance with the ARIA classification, 36.1% of the patients were classified with persistent AR and 63.9% were classified with intermittent AR. The same authors reported on the following frequencies symptoms: sneezing in 89.7% of the patients, nasal congestion in 86.6%, rhinorrhea in 85.9%, nasal itch in 81.0%, conjunctivitis in 70.0%, headache in 48.0% and somnolence in 37.9%.

Allergic rhinitis is more prevalent in women, 55%. In males, this condition was found in 45% of the total number of patients<sup>22</sup>.

Distribution by age shows a high prevalence in childhood but with age, its incidence has dropped significantly (Figure3).

In the age range from 13 to 14 years, the highest incidence of AR is in Nigeria, Paraguay, Malta and Hong Kong, and the lowest in Latvia, Estonia and Albania<sup>23</sup>.

In a study to track the incidence of atopic diseases, in 37 countries, with 193.404 participants over a 5 year period, M Innes Asher et al.<sup>24</sup> found that, in the 6–7

years of age group, the prevalence of symptoms of allergic rhinoconjunctivitis changed more in most centres (80%). Of the 53 centres with changes, 44 showed an increase and nine a decrease in prevalence. In the 13–14 age group, the prevalence of allergic rhinoconjunctivitis changed in most centres (70%). Of the 74 centres with changes, 48 reported an increase and 26 a decrease in prevalence.

Wojciechowska et al.<sup>25</sup> demonstrated striking differences in the prevalence of allergic diseases and sensitization to atopic allergens between school children from rural and urban communities and confirm previous studies on the topic. They establish the presence of one allergic disease in 12.8% of rural children and in 43.3% of urban children.

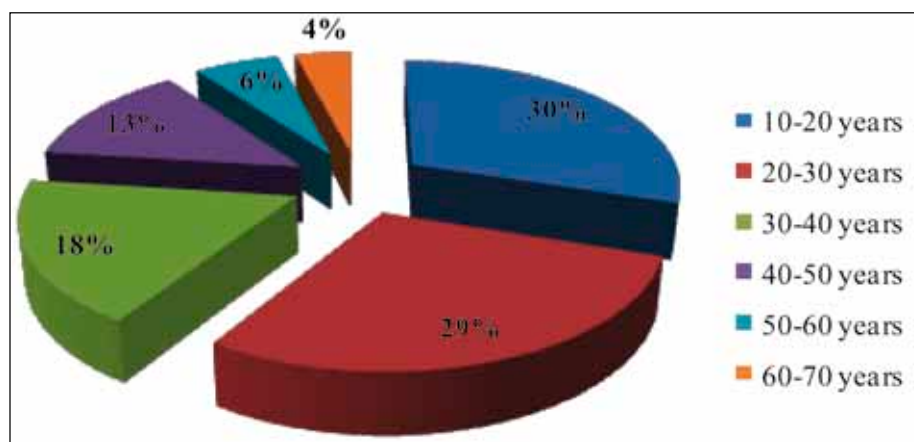
But the problem of coryza is not only nasal discharge and sneezing. The importance of the problem is shown in a series of studies analyzing the comorbidity of the disease.

In a recent analysis of medical claims data<sup>5</sup>, it was noted that approximately 18% of patients with rhinitis had concomitant asthma, and nearly 40% of patients with asthma had concomitant rhinitis. Allergic rhinitis may also be a contributing factor in 25% to 30% of patients with acute maxillary sinusitis and in as many as 60% to 80% of patients with chronic sinusitis<sup>26</sup>.

Longitudinal studies consistently indicate a relationship between allergic rhinitis and asthma –patients with allergic rhinitis have a 3-fold higher risk of developing asthma later in life<sup>27,28</sup>. But there are also messages denying a link between the two diseases<sup>29</sup>.

There is a relationship between nasal allergies and sinus conditions, with 66% of AR patients reporting that they also suffer from rhinosinusitis or sinus conditions. By contrast, only 20% of adults without nasal allergies suffer from rhinosinusitis or sinus problems<sup>30</sup>.

Also, the quality of life in more than 90%<sup>31</sup> of patients is very poor and most of them have trouble sleeping and carrying out their daily activities. While not directly threatening the lives of patients, the wide



**Figure 3** Prevalence of AR in different regions of the world

distribution and the disabling nature of the disorder necessitate finding a solution to tackle the problem as soon as possible.

## CONCLUSIONS

1. Allergic rhinitis is a prevalent disease affecting people around the world.
2. Suffering people are of all ages, with no significant differences by ethnicity and gender.
3. Children and adolescents suffer more often than adults.
4. Atopic diseases including allergic rhinitis continue to increase their frequency, resulting in continually increasing costs for their treatment.
5. While not directly threatening the lives of patients, the prevalence and the disabling nature of the disorder necessitate finding a solution to tackle the problem as soon as possible.

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