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REVIEW PAPER

The prevalence of allergic rhinitis, atopic dermatitis and asthma in the population of children in Poland

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ABSTRACT

Allergic rhinitis (AR), atopic dermatitis (AD), and asthma are among the most prevalent chronic diseases affecting children. This review synthesizes recent epidemiological data on these conditions in Poland, with a focus on prevalence rates, geographic variation, and temporal trends, to assess the current burden and inform future public health strategies. A literature review was conducted using the PubMed database, covering studies published between 1990 and 2021. Key words included: epidemiology, prevalence, asthma, atopic asthma, allergic rhinitis, atopic dermatitis, eczema, children, and childhood. From 235 initial results, 45 studies specifically addressing allergic diseases in the Polish paediatric population were selected for analysis. The prevalence of allergic conditions in Polish children remains high. The Epidemiology of Allergic Diseases in Poland study reported an overall allergy prevalence of 49%, exceeding the global average of 40% reported by the International Study of Asthma and Allergies in Childhood. Urban-rural disparities were consistently observed, with higher rates of AR, AD, and asthma in urban areas. Atopic dermatitis commonly begins in early childhood, while asthma shows a rising trend over the past decades. However, underdiagnosis – especially of asthma – continues to hinder timely intervention and care. Allergic diseases pose a substantial health burden among children in Poland, with prevalence patterns reflecting both global trends and region-specific disparities. While some national data suggest relative stability in prevalence over time, findings also reveal ongoing challenges, including underdiagnosis and urban-rural inequities. Continued epidemiological monitoring is essential to improve disease recognition, guide resource allocation, and support early intervention efforts.

KEY WORDS:

allergic diseases, allergic rhinitis, atopic dermatitis, asthma, children, prevalence, Poland.

INTRODUCTION

The International Study of Asthma and Allergies in Childhood (ISAAC) remains one of the most comprehensive efforts to assess the global prevalence of allergic rhinitis (AR), atopic dermatitis (AD), and asthma in children. In Poland, a comparable initiative, the Epidemiology of Allergic Diseases in Poland (ECAP) study, offered a detailed examination of allergic disease prevalence within the national paediatric population. While ISAAC estimated that approximately 40% of children globally are affected by allergic conditions, ECAP reported a notably higher prevalence of 49% among Polish children, underscoring a significant national burden in line with global concerns. The Global Asthma Network (GAN) study, a continuation of ISAAC, has since contributed updated epidemiological insights on asthma and related allergic conditions, further advancing international comparisons [1].

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Despite extensive research efforts, the reported prevalence of asthma, AD, and AR varies considerably across studies. This variability often reflects differences in study design, diagnostic criteria, and population characteristics, as well as the persistent issue of underdiagnosis and overdiagnosis. The present review aims to clarify the current epidemiological profile of these three allergic diseases in Polish children. To this end, a literature review was conducted using the PubMed database, covering articles published between 1990 and 2021. Search terms included: epidemiology, prevalence, asthma, atopic asthma, allergic rhinitis, atopic dermatitis, eczema, children, and childhood. Based on these criteria, 45 relevant studies were identified and analysed.

Many earlier multicentre studies – some conducted over a decade ago – may be limited by outdated data or methodological inconsistencies that affect the accuracy of prevalence estimates for specific allergic conditions. Consequently, there is a growing need to reassess and update the evidence, particularly for younger children, in order to gain a more accurate picture of disease onset, coexistence, and progression.

Allergic diseases are among the most widespread chronic health conditions affecting children and represent a substantial public health concern worldwide [2, 3]. Among the landmark studies contributing to our understanding of paediatric allergy prevalence is the ISAAC project [4], which indicated that allergic conditions affect around 40% of children [5]. In Poland, the ECAP study found a higher prevalence rate of 49%, reaffirming the relevance of national data in the broader global context [6].

International comparisons reveal that the burden of allergic diseases continues to rise, particularly in developed countries. For instance, nations such as Sweden and the UK have reported higher prevalence rates of AD and asthma compared to countries in Asia and Africa. Poland's prevalence levels, while elevated, generally align with other Central European countries. However, a recurring finding is the disparity between urban and rural populations, with urban children consistently experiencing higher rates of allergic diseases [7–13].

Given the significant and growing burden of these conditions, particularly among Polish children, it is essential to continuously evaluate and synthesize current epidemiological data. This review responds to that need by offering an updated perspective on the prevalence, trends, and regional variations in AR, AD, and asthma within Poland's paediatric population.

TABLE 1. Summary of population-based studies on the prevalence of asthma, allergic rhinitis, and atopic dermatitis in Polish children

Study (year, reference)	Region/cities	Age group (years)	Sample size	Condition(s) assessed	Key prevalence findings
ISAAC Phase I, III, Poland (1994–2002) [23, 42, 44]	Cracow, Poznan	6–7, 13–14	~ 5000	Asthma, AR, AD	Asthma increased: Cracow 6–7 years (4.0% → 5.8%); Poznan 6–7 years (1.3% → 5.9%); Cracow 13–14 years (2.3% → 6.8%)
PMSEAD study (1998–1999) [37, 40, 48]	Multicentre, Poland	3–16	~ 20.000	Asthma, AR	Asthma prevalence: 8.6% (boys 10.9%, girls 6.3%); perennial AR: 2.6% in boys, 1.5% in girls; seasonal AR: 9.8% in boys, 7.4% in girls
ECAP study (2005–2008) [6, 18, 19, 22, 31]	8 major cities, some rural	6–7, 13–14	~ 20.000	Asthma, AR, AD, allergy	Asthma: 20.1% (6–7 years), 10.5% (13–14 years); AD higher in urban (6–7 years: 47.8% vs. 29.1% rural); AR symptoms: 23.6% (6–7 years), 24.6% (13–14 years); allergy prevalence overall 49%
Lodz study (2009) [24]	Lodz	School-aged	1200+	AD	Overall AD prevalence: 9.2%; higher in boys (10.6%) vs. girls (7.9%)
Chorzow longitudinal survey (1993–2014) [43]	Chorzow	7–10	~ 1000 (repeated surveys)	Asthma	Significant rise: 3.4% (1993) → 12.6% (2014)
Majkowska-Wojciechowska *et al*. [31]	Lodz, rural vs. urban	Schoolchildren	~ 1000	AR, asthma	AR 3.5× higher in urban vs. rural; asthma: urban 16.4% vs. rural 2.0%
Lublin Province study (1995–2001) [19]	Rural Lublin	8–13	~ 1500	Asthma	Asthma increased from 3.4% (1995) to 9.6% (2001)
Sybilski *et al*. (ECAP subset) [22]	Multicentre	6–7, 13–14	–	AD	AD is a serious health issue; skin allergy confirmed in 39% of 6–7-year olds and 49% of 13–14-year olds

AD – atopic dermatitis, AR – allergic rhinitis, ECAP – Epidemiology of Allergic Diseases in Poland, ISAAC – International Study of Asthma and Allergies in Childhood, PMSEAD – Polish Multicentre Study of Epidemiology of Allergic Diseases

RESULTS AND DISCUSSION

ATOPIC DERMATITIS

Atopic dermatitis is a chronic inflammatory skin disease, often beginning in infancy, with hallmark symptoms of pruritus and xerosis. Lesion distribution varies with age [14, 15]. Among the "atopic triad," AD usually presents first, increasing the likelihood of comorbid allergic conditions [3, 16–20].

Global estimates, notably from the ISAAC study, suggest that 15–30% of children are affected, with a sharp rise in industrialized nations over the past 30 years. For children aged 6–7 years, ISAAC reported a prevalence of 11.5%, and for those aged 13–14 years, 8.5% [5]. Onset typically occurs early in life: 45% by 6 months, 60% by one year, and 85% by the age of five. Children with early-onset AD are at greater risk of developing sensitizations by the age of two [5].

Numerous studies support this increasing trend. In Scotland, eczema prevalence in children aged 8–13 rose from 5.3% in 1964 to 12% in 1989 [20]. A Danish twin cohort observed a jump from 3% in the early 1960s to 10% in the 1970s among children under seven [21]. In Europe, prevalence now is 12–26%, peaking in the UK and Scandinavia, and is the lowest in countries like Spain and Switzerland [3, 22].

In Poland, the ECAP study, using localized ISAAC methodology, revealed a substantially higher prevalence in urban areas: 47.8% vs. 29.1% (age 6–7), and 40.9% vs. 25% (age 13–14). Skin test confirmation showed sensitization in 39% of younger children and 49% of adolescents [18, 22]. A separate study in Lodz found an overall AD prevalence of 9.2%, with higher rates in boys (10.6%) than in girls (7.9%) [23–25].

Similar trends were observed in other Eastern European countries: Belarus (10.2%), Ukraine (12.4%), and Russia (9.8%), according to the Belarus Ukraine Poland Asthma Studies [26–28].

ALLERGIC RHINITIS

Allergic rhinitis is defined in the Allergic Rhinitis and its Impact on Asthma and PoSLeNN guidelines as an IgE-mediated inflammation of the nasal mucosa triggered by allergen exposure [10, 29, 30]. According to the White Book on Allergies, around 40% of children globally are affected [3].

The International Study of Asthma and Allergies in Childhood Phase III found AR prevalence in 6–7-year-olds ranging from 4.2% (Indian subcontinent) to 12.7% (Latin America), with an average of 8.5%. In 13–14-year-olds, global prevalence reached 14.6%, with the highest observed in Paraguay (45.1%) and the lowest in India (1%) [23].

The Epidemiology of Allergic Diseases in Poland study found AR symptoms in 23.6% (age 6–7) and 24.6% (age 13–14). Urban children had a higher prevalence (24.3% vs. 3.7%) in the younger group and (25.2% vs. 20%) in adolescents [6]. Warsaw (28.8%) and Poznan (39.6%) reported the highest city-specific rates; Gdansk (17.1%) and Zamosc (20%) had the lowest [6].

A notable study from Lodz found AR prevalence 3.5 times higher in urban children than rural, with 43.3% of urban children diagnosed with at least one allergic condition [31]. The Polish Multicentre Study of Epidemiology of Allergic Diseases (1998–1999) also identified gender differences: perennial AR – was more common in boys (2.6%) than girls (1.5%); for seasonal AR, the prevalence was 9.8% in boys and 7.4% in girls [32, 33].

In neighbouring countries, the prevalence was generally lower: Ukraine – 5.7%, Belarus – 3.8%, and Russia – 10% [26–28].

ASTHMA

Asthma is a chronic inflammatory airway disorder marked by bronchial hyperreactivity and variable symptoms such as wheezing, coughing, and dyspnoea [34]. Diagnosing asthma in children remains complex due to symptom overlap and lack of definitive testing [3, 32]. In younger children – particularly those under the age of 6 – wheezing does not reliably predict future asthma [34–36].

Globally, asthma is the most prevalent chronic disease in children. Its epidemiology is primarily assessed through questionnaires on symptoms and diagnoses. Many studies report rising prevalence over recent decades [8, 9, 19, 35, 36–44].

The International Study of Asthma and Allergies in Childhood data highlighted dramatic global variability: prevalence among 13–14-year-olds ranged from 2.1–4.4% (e.g., China, Romania) to 29.1–32.2% (e.g., Australia, UK). In Phase III, prevalence rose slightly for both 13–14 (13.2% → 13.7%) and 6–7-year-olds (11.1% → 11.6%). The UK showed a reversal in this trend [3, 9, 23].

In Poland, Cracow and Poznan participated in ISAAC. Asthma prevalence among 6–7-year-olds increased 4.0–5.8% (Cracow) and 1.3–5.9% (Poznan). For 13–14-year-olds, prevalence rose 2.3–6.8% and 2.0–5.2%, respectively [42, 43].

The Polish Multicentre Study of Epidemiology of Allergic Diseases study found an overall prevalence of 8.6% in children aged 3–16, with higher rates in boys (10.9%) than girls (6.3%) [40]. In rural Lublin, prevalence increased from 3.4% in 1995 to 9.6% in 2001 [19]. Another study in central Poland found a striking urban-rural divide: 16.42% in urban areas vs. 1.97% in rural [31].

The Epidemiology of Allergic Diseases in Poland study (2005) reported asthma prevalence at 20.1% in children aged 6–7 and 10.5% in those aged 13–14 [6].

A 21-year study from Chorzow confirmed this trend: asthma diagnoses rose from 3.4% (1993) to 12.6% (2014) [42]. However, a significant gap remains between self-reported symptoms and confirmed diagnoses, often due to a limited access to pulmonary testing and evolving diagnostic thresholds [10–13, 34, 35, 37–40, 43].

Underdiagnosis is a widespread issue. In Katowice, up to 50% of asthma cases went undiagnosed in children aged 7–17 [43], consistent with other findings [44–51].

Asthma prevalence in Eastern Europe appears lower: 1.3% in Belarus, 1.7% in Ukraine, but 6.0% in Russia, per GAN [26–28].

CONCLUSIONS

Allergic diseases remain a major public health issue affecting a substantial portion of the paediatric population (Table 1). Evidence from Poland aligns with findings from large-scale global studies such as ISAAC, which report a sustained increase in the prevalence of conditions like asthma, AD, and AR. Despite this, data quality is uneven, with existing estimates potentially skewed by under- or overreporting of specific allergic disorders. This highlights the urgent need for updated, high-quality epidemiological studies – especially targeting younger age groups – to better understand the true burden and co-occurrence of these conditions.

Although improvements in air quality may have contributed to a reduction in some respiratory symptoms [51, 52], the overall trend reflected in this review points to a persistently high and, in some cases, increasing prevalence of allergic diseases in both global and Polish contexts. Notably, while trend data for 1993–2014 suggest relative stability in some regions of Poland [44, 52], findings from studies such as ISAAC, ECAP, and GAN reveal considerable heterogeneity based on geographic location, urban vs. rural settings, and methodological differences. This variability emphasizes the need for consistent monitoring and targeted public health strategies. The overall trajectory, however, continues to suggest a growing epidemiological and clinical burden, reinforcing the importance of early detection, accurate diagnosis, and equitable management of allergic conditions in children.

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