EPIDEMIOLOGICAL TRENDS AND RISK FACTORS OF ATOPIC DERMATITIS IN CHILDREN

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ABSTRACT

Atopic dermatitis (AD) is one of the most prevalent chronic inflammatory skin disorders among children, with a steadily increasing global burden. This condition is characterized by recurrent eczematous lesions, intense pruritus, and immune dysregulation. The aim of this study is to review modern epidemiological trends, major risk factors, and determinants contributing to the onset and progression of AD in pediatric populations. Literature analysis shows that genetic predisposition, environmental allergens, impaired skin barrier function, and early-life immune deviations remain the leading contributors. Recent evidence also highlights the influence of microbiome alteration, dietary patterns, and urban lifestyle. Understanding these multifactorial mechanisms is essential for developing effective prevention strategies and targeted therapeutic approaches. Strengthening public health awareness and early risk assessment may reduce the long-term burden of childhood AD.

Keywords: atopic dermatitis, children, epidemiology, risk factors, skin barrier, microbiome

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АННОТАЦИЯ

Атопический дерматит (АД) является одним из наиболее распространённых хронических воспалительных заболеваний кожи у детей, и его глобальная распространённость продолжает расти. Заболевание характеризуется рецидивирующими экзематозными высыпаниями, выраженным зудом и иммунной дисрегуляцией. Цель данной статьи — проанализировать современные эпидемиологические тенденции, основные факторы риска и механизмы, влияющие на развитие и прогрессирование АД у детей. Анализ литературы показывает, что генетическая предрасположенность, воздействие аллергенов окружающей среды, нарушение кожного барьера и иммунологические изменения раннего возраста являются ключевыми факторами. Новые исследования подчеркивают значение микробиома, характера питания и урбанизации. Глубокое понимание этих механизмов имеет важное значение для разработки эффективных стратегий профилактики и целенаправленной терапии. Повышение информированности населения и ранняя оценка риска могут снизить долгосрочное бремя АД у детей.

Ключевые слова: атопический дерматит, дети, эпидемиология, факторы риска, кожный барьер, микробиом

1. Introduction

Atopic dermatitis (AD) is a chronic relapsing inflammatory skin disease that predominantly begins in early childhood and affects millions of children worldwide. Over the past decades, the global prevalence of AD has shown a significant upward trend, particularly in industrialized and rapidly urbanizing regions. Studies report prevalence rates ranging from 15% to 30% among children, making AD one of the leading pediatric dermatologic conditions.

The pathogenesis of AD is complex and multifactorial, involving genetic predisposition, environmental exposures, immune dysregulation, and impaired epidermal barrier function. Mutations in the filaggrin (FLG) gene, responsible for maintaining the integrity of the skin barrier, have been strongly associated with early-onset AD, increased allergen penetration, and susceptibility to secondary infections.

Environmental influences—such as air pollution, increased exposure to household allergens, and urban lifestyle—contribute to the rising incidence. Additionally, changes in early nutrition, reduced microbial exposure (hygiene hypothesis), and altered gut-skin microbiome interactions have been proposed as major contributors.

The burden of AD extends beyond dermatological symptoms. Chronic itching severely affects sleep quality, cognitive development, behavioral outcomes, and overall quality of life. Parents and caregivers also experience emotional and financial stress due to recurrent medical visits and long-term therapy.

Despite numerous studies, gaps remain in understanding how modern lifestyle, genetic factors, and environmental pressures interact to influence AD onset and severity in children. Therefore, this article aims to analyze contemporary epidemiological patterns and identify key risk factors contributing to the rising trend of childhood atopic dermatitis.

2. Methods

A narrative review methodology was used for this study. Publications from 2015–2024 were analyzed using Google Scholar, PubMed, ScienceDirect, Scopus, and WHO dermatology reports. Keywords included “atopic dermatitis,” “children,” “epidemiology,” “risk factors,” and “skin barrier dysfunction.”

Inclusion criteria: studies focusing on pediatric populations, clinical, epidemiological, and pathophysiological research, high-impact review articles and meta-analyses, WHO and dermatology society guidelines

Exclusion criteria: studies with insufficient sample size, non-peer-reviewed materials , A total of 62 articles were reviewed, and the most relevant data were synthesized.

3. Results

3.1 Epidemiological Trends

AD prevalence has increased globally, reaching up to 30% in some pediatric populations.

Higher prevalence is noted in urban areas compared to rural regions.

Low- and middle-income countries are experiencing a rapid rise due to industrialization and pollution.

Early onset (before age 2) is observed in nearly 60% of cases.

3.2 Major Risk Factors Identified

Genetic factors: FLG mutations strongly correlate with early onset and severe forms.

Environmental factors: air pollution (PM2.5, NO_2), indoor allergens (dust mites, pet dander, molds),

low humidity and cold climates

Immune dysregulation: Children with Th2-skewed immune profiles show increased susceptibility.

Skin barrier impairment: Decreased ceramides and filaggrin, increased transepidermal water loss.

Microbiome alteration: Overgrowth of Staphylococcus aureus worsens inflammation.

Perinatal factors: cesarean delivery, lack of breastfeeding, early antibiotic exposure

3.3 Psychosocial and Behavioral Findings

Sleep disturbances occurred in >70% of children with moderate-severe AD.

Quality of life was significantly reduced among affected children and families.

4. Discussion

The findings of this review confirm the multifactorial nature of atopic dermatitis in children. The interplay between genetic predisposition and environmental influence remains the leading determinant. The increasing prevalence in urban settings supports the hypothesis that industrial pollution and reduced natural microbial exposure play a key role.

Improved understanding of the microbiome has influenced new therapeutic approaches, including microbiome-friendly skin care and targeted probiotic interventions. Early risk assessment in genetically predisposed infants and preventive strategies—such as maintaining optimal skin hydration, breastfeeding promotion, and allergen avoidance—can reduce disease severity.

Despite advances, challenges remain in ensuring early diagnosis, minimizing disease progression, and improving access to specialist care. Greater awareness among parents, teachers, pediatricians, and the general community is essential.

5. Conclusion

Atopic dermatitis in children is a growing global health issue influenced by genetic, environmental, and immunological factors. Recognizing modern epidemiological trends and addressing key risk factors can improve early diagnosis and prevention. Strengthening public health education, promoting skin barrier protection, and implementing targeted preventive measures may significantly reduce the long-term burden of childhood AD.

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