AUCTORES
Globalize your Research

Clinical Research and Clinical Trials

Heike Felipe Rangel Dias *

Open Access

Research Article

Exploring the Frequency and Characteristics of Dermatologic Manifestations in Pediatric Autoimmune Diseases: An Evaluation Study

Heike Felipe Rangel Dias [1]*, Bruna Colombo Baptista [2], Paula Venâncio Sousa [3], Gabriela Bicalho Cordier [4], Sara Mozardo Vilerá [5], Raquel Borges de Freitas Lopes [6], Letícia Zelioli Bernini [7]

[1] Center for Biological and Health Sciences, Brazil

[2] Medical Student Pontifical Catholic University of Minas Gerais, Betim campus, Rua do Rosário, 1081 - Angola, Betim - MG, CEP: 32604-115

[3] Graduated in Medicine Pontifical Catholic University of Minas Gerais, Poços de Caldas campus, Av. Padre Cletus Francis Cox, 1661 - Jardim Country Club, Poços de Caldas - MG, CEP : 37714-620

[4] Medical Student Pontifical Catholic University of Minas Gerais, Betim campus, Rua do Rosário, 1081 - Angola, Betim - MG, CEP: 32604-115

[5,6,7] Medical Student, Educational Foundation of Penápolis, Av. São José, 400 - Vila São Vicente, Penápolis - SP, 16303-180

***Corresponding Author:** Heike Felipe Rangel Dias, Center for Biological and Health Sciences, Brazil.

Received date: January 29, 2025; **Accepted date:** April 25, 2025; **Published date:** June 30, 2025

Citation: Rangel Dias HF, Bruna C. Baptista, Paula V. Sousa, Gabriela B. Cordier, Sara M. Vilerá, Raquel Borges de Freitas Lopes, Letícia Z. Bernini, et al, (2025), Exploring the Frequency and Characteristics of Dermatologic Manifestations in Pediatric Autoimmune Diseases: An Evaluation Study, *Clinical Research and Clinical Trials*, 12(3); **DOI:10.31579/2693-4779/257**

Abstract:

Introduction: Pediatric autoimmune diseases require specific care. This study explores their dermatological manifestations, pathophysiology, and treatment strategies to improve patient prognosis.

Objective: This study investigates dermatological manifestations in pediatric autoimmune diseases, emphasizing their importance in diagnosis and management. It discusses pathophysiology, diagnostic challenges, assessment tools, and treatment strategies, emphasizing the need for personalized approaches to enhance patient outcomes.

Methodology: This study reviewed literature on dermatological manifestations in pediatric autoimmune diseases. It adopted a systematic methodology, including literature search, content analysis, and results discussion, to offer a comprehensive and informative understanding of these conditions, highlighting diagnostic challenges, assessment tools, and treatment strategies.

Discussion and Results: Pediatric autoimmune diseases encompass conditions like juvenile idiopathic arthritis (JIA) and plaque psoriasis, requiring specific care due to their manifestation on the skin and joints. Differential diagnosis considers unique childhood features, such as persistent skin rashes and symptom overlap. Assessment tools like CDASI and CAT help quantify the severity of skin lesions. Treatment includes topical corticosteroids and emollients to control inflammation and maintain skin barrier. Effective management of skin symptoms positively influences overall prognosis, underscoring the importance of early intervention and personalized approach to improve affected children's quality of life.

Conclusion: This study reveals the complexity of pediatric autoimmune diseases, emphasizing the importance of differentiation in diagnosis and treatment. It underscores the vital role of medication in minimizing damage, highlighting the relationship between skin symptoms and systemic pathologies. It recognizes the need for age-specific approaches and underscores the critical role of skin manifestations in early diagnosis and treatment. It contributes to advancing knowledge and suggests future research directions, including the need for personalized and effective management strategies.

Keywords: autoimmune diseases; pediatrics; skin physiological phenomena; skin abnormalities

Introduction

Pediatric autoimmune diseases are a group of conditions that can have significant and long-lasting effects on children's health. These diseases are distinct from autoimmune diseases that affect adults and require specialized care and management. In recent years, there has been a growing interest in the dermatological manifestations of these diseases, which can be a useful diagnostic tool.

This research work aims to explore the frequency and characteristics of dermatological manifestations in pediatric autoimmune diseases and to evaluate the current knowledge of their pathophysiology.

The article will begin with an overview of common pediatric autoimmune diseases and how they affect children differently than adults. Then, we will delve into the types of cutaneous manifestations observed in these conditions, their frequency, and the diagnostic challenges associated with them.

Finally, the article will examine the assessment tools used to assess cutaneous manifestations in pediatric autoimmune diseases, treatment strategies to control dermatologic symptoms, and how the management of cutaneous symptoms affects the overall prognosis of pediatric autoimmune diseases. By providing an in-depth exploration of these topics, this research paper aims to improve our understanding of these conditions and ultimately improve patient outcomes.

Objective

This scientific study aims to explore and understand dermatological manifestations in pediatric autoimmune diseases, providing a comprehensive overview of the characteristics of these conditions and the impact they have on children's health. Initially, he emphasizes the growing importance given to cutaneous manifestations in these diseases, which can serve as valuable indicators for early diagnosis and effective management.

Throughout the text, several aspects related to pediatric autoimmune diseases are addressed. Starting with the identification of the most common diseases in this age group, such as juvenile idiopathic arthritis and pediatric plaque psoriasis, the study highlights the complexity and diversity of these conditions, highlighting the need for a differentiated approach compared to adults.

An in-depth analysis is made on how autoimmune diseases affect children distinctly, considering not only the immediate health challenges but also the long-term implications on growth and development. The importance of medication and lifelong follow-up is highlighted, including the transition from pediatric to adult care.

The study also discusses current knowledge of the pathophysiology of these diseases in children, highlighting the importance of early intervention and careful evaluation to identify potential underlying autoimmune diseases.

A significant part of the text is dedicated to the analysis of the specific cutaneous manifestations observed in these diseases, as well as the frequency with which they occur. The diagnostic challenges associated with these cutaneous symptoms are highlighted, emphasizing the importance of early recognition and understanding of the unique characteristics of dermatological presentations in children.

In addition, the assessment tools used to assess cutaneous manifestations and effective treatment strategies to control these symptoms are discussed. The text emphasizes the importance of an individualized and differentiated approach in the management of pediatric autoimmune diseases, considering the specific needs of each patient.

Finally, the study highlights the relationship between the management of cutaneous symptoms and the overall prognosis of pediatric autoimmune diseases, emphasizing the importance of early recognition and appropriate treatment of cutaneous manifestations to improve long-term outcomes.

Methodology

The methodology adopted to carry out this literature review study on dermatological manifestations in pediatric autoimmune diseases followed a systematic protocol to ensure the scope and quality of the analysis. Initially, an extensive bibliographic search was carried out in scientific databases, such as PubMed, Scopus and Web of Science, using specific search terms "Autoimmune Diseases"; "Pediatrics"; "Physiological Phenomena of the Skin"; "Skin Abnormalities". Inclusion criteria were defined to select relevant studies published in peer-reviewed journals, preferably in the last 10 years, focusing on clinical characteristics, pathophysiology, evaluation, and management of dermatological manifestations in pediatric patients with autoimmune diseases.

After selecting the studies, a systematic content analysis was performed to extract pertinent information, including data on the most common pediatric autoimmune diseases, types of skin manifestations observed, frequency of these manifestations, associated diagnostic challenges, assessment tools used, and treatment strategies employed. The analysis also addressed how the management of cutaneous symptoms may influence the overall prognosis of paediatric autoimmune diseases.

The data were synthesized and organized according to the themes identified in the discussion, with emphasis on the main findings and trends observed in the literature reviewed. Direct quotations and paraphrases were used to support the information presented, ensuring the credibility and accuracy of the text.

Finally, the discussion and interpretation of the results were carried out to contextualize the findings within the current panorama of research in pediatric autoimmune diseases and to identify gaps in knowledge that can direct future investigations. This systematic and rigorous methodological approach has allowed for a comprehensive and informative analysis of dermatological manifestations in pediatric autoimmune diseases, contributing to the advancement of scientific understanding in this area and providing relevant insights for clinical practice and future research.

Discussion and Results

Overview of Pediatric Autoimmune Diseases

What are the common pediatric autoimmune diseases?

Among the number of autoimmune diseases that affect children, juvenile idiopathic arthritis (JIA) is particularly prevalent, representing a significant condition in which the immune system mistakenly targets joint tissues, leading to sustained inflammation and discomfort in affected youth [1]. While JIA is a major concern due to the potential for chronic pain and disability, the skin is also a common target of autoimmune dysregulation in the pediatric population, as evidenced by pediatric plaque psoriasis. This condition manifests itself with characteristic red and scaly skin patches, which not only cause physical discomfort but can also lead to psychological distress due to their visible nature [1].

Further complicating the picture of autoimmune diseases in children is pediatric active psoriatic arthritis, a condition that lies at the intersection of autoimmune diseases of the skin and joints. Like its adult counterpart, paediatric active psoriatic arthritis presents symptoms that include joint inflammation and skin lesions, thus representing an overlap of the symptomatology seen in JIA and paediatric plaque psoriasis [1].

These conditions underscore the complexity and diversity of autoimmune diseases in pediatric demographics, requiring a differentiated approach to diagnosis and management that considers the unique aspects of these diseases in the context of a developing child.

How do autoimmune diseases affect children differently from adults?

The impact of autoimmune diseases on children requires a multifaceted approach to management and care. Unlike adults, children with autoimmune diseases such as alopecia areata, vitiligo, scleroderma and chronic urticaria not only face immediate health challenges, but also face the long-term implications of their conditions on growth and development [2].

To mitigate the progression of these diseases and minimize the damage, medication plays a crucial role. For example, emerging treatments have shown promise in reducing or even stopping the damage caused by autoimmune responses, thus preserving the child's health during critical developmental phases [3].

It is imperative to understand that these children will need lifelong monitoring and health care to effectively manage their conditions. This

includes a clinician-orchestrated transition plan to move from pediatric to adult care, ensuring that children are equipped with the tools and knowledge they need to manage their health as they mature [3].

This transition is delicate and requires a comprehensive understanding of the unique challenges faced by these young patients, who must learn to navigate the complexities of their conditions throughout the different stages of life.

What is the current understanding of autoimmune pathophysiology in pediatrics?

In the intricate landscape of pediatric autoimmune pathophysiology, recent advances have illuminated the unique features of these conditions in children. Unlike adults, pediatric patients have specific clinical manifestations and antibody profiles, which require personalized approaches for diagnosis and treatment [4]. For example, pediatric autoimmune motor disorders, now increasingly recognized due to these advances, exemplify how early intervention can dramatically improve patient outcomes [4].

This early intervention is particularly crucial given that autoimmune and inflammatory diseases are prevalent among children with primary immunodeficiencies (PID), and these manifestations often present before or simultaneously with the diagnosis of PID itself [5]. Consequently, it is critical that pediatric patients with autoimmune symptoms be evaluated for underlying PIDs to ensure comprehensive treatment and mitigate the risk of complications that can severely impact their quality of life [5].

The complexity of these autoimmune conditions in paediatric populations underlines the need for continued research and collaboration between specialists, such as rheumatologists and dermatologists, to optimise care for affected children, particularly those with skin involvement, which is not uncommon [6].

Dermatological manifestations in pediatric autoimmune diseases

What types of skin manifestations are observed in pediatric autoimmune diseases?

In pediatric autoimmune diseases, skin manifestations are not just superficial signs, but play a critical role in diagnosis and treatment. Vitiligo, a type of autoimmune dermatosis, is most commonly seen in children with humoral immunodeficiencies, although its prevalence observed in the pediatric cohort of the study was surprisingly lower than expected, between 0.5 and 2% [7].

This discrepancy emphasizes the need for greater clinical awareness when assessing cutaneous symptoms in autoimmune diseases. In addition, lupus erythematosus, which encompasses several subtypes, including systemic, subacute cutaneous, chronic cutaneous, and neonatal lupus, stands out as the most prevalent connective tissue disease in childhood [8].

Among these, systemic lupus erythematosus (SLE) is the most frequent pediatric presentation, although subacute cutaneous lupus is extremely rare in this age group [8]. These cutaneous stigmata are invaluable diagnostic clues, not only for lupus, but also for systemic childhood disorders in general [8]. Early recognition of these cutaneous manifestations is critical, as it can allow immediate initiation of therapy, potentially avoiding serious outcomes [8].

Pediatric patients may have different skin characteristics compared to adults with the same systemic diseases, emphasizing the importance of considering age-specific presentations when evaluating autoimmune skin manifestations [8]. For example, diseases such as Kawasaki disease (KD), Henoch-Schönlein purpura (HSP), acute childhood hemorrhagic edema, and neonatal-onset multisystem inflammatory disease (NOMID) have unique cutaneous features that are typically seen in the pediatric population. 8]. In addition, neutrophilic and granulomatous palisade dermatitis (PNGD) is an example of a skin disease that presents with symmetrical papular lesions in the extremities of children and is associated with autoimmune diseases that generate immune complexes, illustrating the complex interaction between cutaneous and systemic symptoms in these children. diseases [8].

How often do dermatological symptoms appear in these conditions?

Dermatologic symptoms are a hallmark of dermatomyositis and present with a variety of manifestations that, similar to juvenile idiopathic arthritis and pediatric plaque psoriasis, can affect both children and adults [9]. In approximately 80% of patients in the acute phase of the disease, cutaneous manifestations, such as the characteristic heliotropic eruption – marked by a reddish-purple discoloration on the upper eyelids – and Gottron's papules, which appear as scaly, protruding protuberances over the joints, can be observed [8][10].

These skin changes, although indicative of dermatomyositis, often lead to incorrect diagnoses; for example, Gottron's papules can be mistaken for psoriasis or atopic dermatitis, highlighting the challenge in accurately identifying dermatomyositis based on dermatological symptoms alone [8].

Notably, in up to 40% of individuals, skin changes may be the initial and only sign of early disease, emphasizing the importance of recognizing these dermatological patterns for early diagnosis and treatment [9]. In addition, although the onset of symptoms in dermatomyositis can be unpredictable and may wax and wane for no apparent reason, persistent dermatological problems such as the shawl sign or the V sign rash - both of which show photosensitivity - are often present and can significantly affect the quality of treatment. patients' lives [9] [8].

What are the diagnostic challenges associated with cutaneous symptoms in pediatric patients?

Based on the recognition that autoimmune diseases present a spectrum of challenges in pediatric populations, the diagnostic complexities become especially pronounced in the evaluation of cutaneous symptoms. Neonatal-onset multisystem inflammatory disorder (NOMID) exemplifies this situation, with its characteristic recurrent evanescent urticarial eruption that appears early in life [8]. These cutaneous manifestations, which are universal among NOMID patients, are not transient, but persist throughout the individual's life, presenting a continuous diagnostic obstacle for physicians [8].

The singular presence of cutaneous symptoms, as seen in some pediatric cases, further intensifies the challenge, as these symptoms may be the only initial clue to an underlying systemic problem [8]. Furthermore, the rashes associated with conditions such as NOMID are not only cosmetic concerns, but are often accompanied by systemic symptoms, such as fatigue and difficulty with physical activity, which can be mistakenly attributed to behavioral problems, such as laziness, rather than a medical condition [8][11]. This misattribution can lead to delays in proper diagnosis and treatment, affecting the child's willingness to engage in normal activities due to discomfort or misunderstanding of their condition [11].

To effectively navigate these diagnostic challenges, a detailed medical history, including a family history of autoimmune disease, and a comprehensive physical examination are vital components that can provide clues and aid in the identification of disorders such as NOMID [8].

Evaluation and management of dermatological symptoms

What evaluation tools are used to evaluate cutaneous manifestations in pediatric autoimmune diseases?

In the context of pediatric autoimmune diseases, particularly Juvenile Dermatomyositis (JDM), cutaneous manifestations are a critical aspect that requires precise and sensitive measurement tools. Among the many recommended tools, the Cutaneous Dermatomyositis Disease Area and Severity Index (CDASI) stands out for its comprehensive assessment of skin involvement.

CDASI examines multiple anatomical locations – 16 areas of the body in total – scoring each for the presence and severity of erythema, thickness, scaling, excoriation, ulceration, and separate scores for Gottron lesions, periungual changes, and alopecia, thus offering a differentiated picture of the skin. disease activity [12] [13]. In addition, CDASI activity scores range

from 0 to 100, with harm scores ranging from 0 to 32, allowing categorization of disease activity levels as low, moderate, or high after a physician's assessment, based on established cut-off values [12].

The design of the tool for adults and children with dermatomyositis ensures its relevance across a broad age spectrum, increasing its usefulness in clinical practice [12]. In addition, the Cutaneous Assessment Tool (CAT) Skin Disease Activity Score uses a different approach, with 10 items to assess skin activity and 4 items to assess skin damage, with 7 items common to both scores. This tool also allows clinicians to classify the characteristics of the injury depending on the severity, which is essential for tailoring treatment strategies to the patient's individual needs [12].

The CAT and CDASI tools, by covering a range of dermatological features and allowing for graded assessment of severity, demonstrate the evolution of measurement tools designed to capture the complex dermatological presentations seen in MJD, thereby facilitating more accurate monitoring and management of skin disease activity in affected patients. paediatric populations.

What treatment strategies are effective for managing dermatological symptoms?

In the field of pediatric dermatology, where conditions such as atopic dermatitis (AD) are prevalent, effective management strategies are essential. First-line treatments for AD flare-ups often include topical corticosteroids (TCS), which are widely recognized for their effectiveness in reducing inflammation and pruritus [14].

Medium-power CTS are particularly safe for use in specific regions of the body, except in the facial area, with adequate monitoring in primary care settings [14]. In addition to TCS, the liberal application of fragrance-free emollients is essential for both daily prevention and active treatment.

Emollients play a crucial role in retaining and replenishing skin moisture, which not only reduces the severity of the disease but also prolongs the interval between flare-ups [15]. In addition, by maintaining the skin barrier, emollients significantly reduce the need for prescription medications, underlining their importance as a primary therapy for both the management and maintenance of flare-ups [15].

For children who do not experience disease-free intervals with only basic skin care and emollients, TCS remains a key component of their AD treatment regimen [14].

Pediatricians and dermatologists must balance the potency of steroids with the vulnerability of youthful skin, opting for low-potency steroids on thinner skin areas to minimize the risk of atrophy, while considering medium- to high-potency steroids for localized lesions of acute contact allergic dermatitis. achieve rapid symptom control [16]. Thus, a differentiated and individualized approach to treatment selection is critical for effective control of dermatologic symptoms in children, particularly when addressing the complexities of autoimmune skin diseases such as pediatric plaque psoriasis and AD.

How does the management of cutaneous symptoms affect the overall prognosis of paediatric autoimmune diseases?

The intricate relationship between cutaneous symptoms and systemic autoimmune pathologies cannot be exaggerated, especially when considering the prognosis of pediatric patients. The skin often acts as a mirror, reflecting underlying immune system dysfunctions, with skin stigmas offering critical diagnostic information for systemic disorders affecting children [8].

Early identification of these dermatological features is critical; triggers the timely initiation of therapeutic interventions that can significantly alter the trajectory of the disease [8]. For example, unusual rashes or skin discolorations in a child may signal the onset of a more complex autoimmune disorder that necessitates rapid medical attention.

This proactive management is not only crucial for resolving immediate discomfort but also for improving long-term outcomes. In addition, the varied expression of cutaneous symptoms in pediatric autoimmune diseases, as opposed to their adult counterparts, underlines the need for age-specific clinical strategies [8].

By focusing on the rapid and effective treatment of these skin manifestations, healthcare providers can have a substantial impact on the overall prognosis of these young patients, thereby mitigating potential complications and improving quality of life [8].

Conclusion

The present study clarifies the frequency and characteristics of dermatological manifestations in pediatric autoimmune diseases, highlighting the complexity and diversity of these conditions in pediatric demography.

The results emphasize the need for a differentiated approach to diagnosis and treatment that considers the unique aspects of these diseases in the context of a developing child, in addition to suggesting that medication plays a crucial role in mitigating the progression of these diseases and minimizing harm, specifically highlighting the intricate relationship between cutaneous symptoms and systemic autoimmune pathologies. In addition, the study underlines the need for age-specific clinical strategies, given the varied expression of cutaneous symptoms in pediatric autoimmune diseases, as opposed to their adult counterparts.

The results also reveal that cutaneous manifestations are not just superficial signs but play a critical role in diagnosis and treatment, highlighting the importance of clinical awareness when assessing cutaneous symptoms in autoimmune diseases. In addition, the study suggests that early recognition of these cutaneous manifestations is critical, allowing immediate initiation of therapy and potentially avoiding serious outcomes.

The findings require a comprehensive understanding of the unique challenges faced by young patients with autoimmune diseases, who must learn to navigate the complexities of their conditions throughout the different stages of life. Finally, the study underlines the importance of effective management strategies for prevalent conditions such as atopic dermatitis (AD) and cutaneous manifestations in Juvenile Dermatomyositis (JDM), which require accurate and sensitive measurement tools.

Overall, this study contributes to the continued advancement of knowledge in the field and suggests future directions for research, including the need for personalized approaches to diagnosis and treatment and the development of more effective management strategies for pediatric autoimmune diseases.

References

1. How to recognize the signs of autoimmune diseases. Children's Medical Center.
2. D'Auria E, Minutoli M, Colombo A, Sartorio MUA, Zunica F, Zuccotti G and Lougaris V (2023) Allergy and autoimmunity in children: non-mutually exclusive diseases. A narrative review. Front. Pediatr. 11:1239365.
3. https://scholar.google.com/scholar?hl=en&as_sdt=0%2C5&q=PATEL+A%2C+Pediatric+Autoimmune+Disease+and+Rheumatology%2C+UVA+Children%27s.+Available+at%3A+https%3A%2F%2Fchildrens.uvahealth.com%2Fservices%2Fpediatric-rheumatology&btnG=
4. DUTT,

DOI:10.31579/2693-4779/257