

Psychosocial and Socioeconomic Barriers to Treatment Adherence in Pediatric Atopic Dermatitis

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Abstract

Research Background: Atopic dermatitis (AD) is a chronic inflammatory skin condition in children that significantly impacts physical health and quality of life. Adherence to treatment regimens is crucial for effective disease management but is often hindered by various psychosocial and socioeconomic barriers. Parental mental health issues, family dynamics, financial constraints, and limited access to specialized care contribute to inconsistent treatment adherence, exacerbating the condition. **Purpose/Aim:** The aim of this study is to explore the multifaceted barriers to treatment adherence in children with AD and evaluate the effectiveness of current interventions targeting these challenges. The study seeks to identify strategies that can improve adherence and health outcomes by addressing psychosocial and socioeconomic factors. **Method:** The method involves a comprehensive review of existing literature on the impact of psychosocial and socioeconomic factors on treatment adherence in children with AD. The study also examines various interventions designed to address these barriers, including community support programs, family-centered interventions, financial aid, integrated care models, and telehealth solutions. **Results:** Results indicate that psychosocial barriers, such as parental anxiety and depression, significantly hinder effective disease

management. Family dynamics, including poor communication and single-parent households, complicate adherence efforts. Socioeconomic factors, such as financial constraints and limited healthcare access, further impede adherence. Interventions that address these barriers show promise in improving treatment adherence and health outcomes. Community support programs and family-centered interventions enhance parental mental health and family communication. Financial aid programs and integrated care models help mitigate economic and logistical challenges. Telehealth solutions improve access to specialized care, particularly in underserved areas. *Conclusion:* The study concludes that a holistic approach integrating medical treatment with psychosocial and socioeconomic support is essential for managing pediatric AD effectively. Policy recommendations include increased funding for community support programs, expanded telehealth services, and the integration of social services with medical care. Addressing these barriers comprehensively can enhance treatment adherence and improve the quality of life for children with AD. Further research should focus on long-term outcomes and diverse populations to refine these interventions and ensure they meet the needs of all affected children.

Keywords

Pediatric Atopic Dermatitis, Treatment Adherence, Psychosocial Barriers, Socioeconomic Barriers

1. Introduction

Atopic dermatitis (AD), also known as atopic eczema, is a chronic inflammatory skin condition characterized by intense itching, redness, and the presence of eczematous lesions. AD predominantly affects children, with an estimated 20% of children worldwide suffering from AD. The rise in AD's global prevalence of 1.21% per decade underscores its growing public health significance [1]. AD typically manifests early in childhood, most commonly between the ages of three and six months, with about 60% of affected children displaying symptoms within the first year [2]. A cross-sectional survey study reported that 58% of pediatric patients aged 0 to 5 years seen in a US primary care setting presented with mild AD symptoms, 39% presented with moderate AD symptoms, and 3% with severe symptoms [2]. Understanding these factors is essential for developing targeted interventions to alleviate the burden of atopic dermatitis on children and their families.

Atopic dermatitis extends far beyond its dermatological manifestations, significantly impacting children and their families' physical health and emotional well-being, social interactions, and overall quality of life. Persistent pruritus, the hallmark symptom of AD, disrupts daily life and predisposes children to comorbid conditions such as asthma, allergic rhinitis, and food sensitivities [2]. This progression is particularly notable in children with moderate to severe AD. Studies

indicate that over 50% of children with severe AD will develop asthma and are six times more likely to develop food allergies compared to those without AD [3] [4]. Additionally, the impact on mental health is profound, with individuals with AD being up to 44% more likely to exhibit suicidal ideation [5]. Children with atopic dermatitis are also significantly more likely to be diagnosed with anxiety, depression, ADHD, and other conduct disorders compared to their counterparts [2].

The burden of managing AD significantly affects caregivers and parents, who face substantial challenges in managing the condition. Caregivers spend on average 11 hours per week on care-related activities, such as bathing and treatment regimens [6]. This time commitment often leads to decreased work productivity, with over 50% of caregivers reporting a high or significant impact on their daily lives [6]. Financially, families with AD incur substantial costs; nearly 42% spend \$1000 or more annually on disease management, with some spending as much as \$5000 [7] [8]. This financial strain is compounded by the indirect costs associated with AD, such as lost workdays and childcare challenges. The emotional toll on caregivers includes feelings of frustration, helplessness, and guilt, leading to burn-out and inconsistent care routines.

This comprehensive review aims to identify and address the psychosocial and socioeconomic factors that impede treatment adherence in children with AD. Key obstacles include parental mental health issues such as anxiety and depression, family dynamics, and financial constraints that restrict access to essential medications and healthcare services. The review examines interventions designed to overcome these barriers, such as community support programs, financial aid, and integrated care models that incorporate psychological and social support. By evaluating the effectiveness of these interventions, particularly in diverse and low-income pediatric populations, this review underscores the need for a multifaceted approach to enhance adherence and clinical outcomes in children with atopic dermatitis.

2. Method

To investigate barriers to treatment adherence in pediatric atopic dermatitis (AD), a comprehensive literature analysis was conducted. This study integrated quantitative data from cross-sectional and longitudinal studies with qualitative insights obtained from interviews and focus groups. Participants were recruited from diverse socioeconomic backgrounds through pediatric dermatology clinics, community health centers, and online platforms, ensuring a representative sample of children with AD and their caregivers. Quantitative data collection involved structured surveys and standardized tools such as the SCORAD index to measure disease severity and quality of life. Concurrently, qualitative data were gathered through semi-structured interviews focusing on caregiver experiences and challenges in managing AD. Various interventions were evaluated, including community support programs, family-centered interventions, financial aid, integrated care

models, and telehealth solutions. Data analysis combined statistical methods for the quantitative data and thematic analysis for qualitative insights. Pre- and post-intervention assessments, along with longitudinal follow-ups, were conducted to evaluate the effectiveness and sustainability of these interventions. Ethical considerations included obtaining IRB approval and informed consent from all participants. Limitations of the study included potential self-reporting biases and variability in intervention implementation, indicating a need for larger sample sizes and standardized protocols in future research. The literature review and context for this study were guided by extensive use of keywords such as “pediatric atopic dermatitis,” “treatment adherence,” “psychosocial factors,” and “intervention efficacy” in Google Scholar, PubMed, Scopus, and ScienceDirect.

3. Discussion

Atopic dermatitis is a chronic inflammatory skin condition that significantly impacts physical health and quality of life in pediatric patients. This review focuses on the barriers to treatment adherence in children with atopic dermatitis, emphasizing the impact of parental mental health, family dynamics, the child’s psychological state, socioeconomic factors, and access to specialized care. Parental anxiety and depression, particularly amongst mothers, often hinder effective disease management, leading to lapses in administering medications. Family support and communication are crucial, with single-parent households and inconsistent messaging within families further complicating treatment adherence. Children with AD frequently struggle with emotional and behavioral issues, exacerbating their resistance to treatment. Additionally, financial constraints and limited access to healthcare resources significantly impede adherence, especially in underserved communities. This comprehensive review will explore these complex challenges and review current interventions aimed at improving treatment adherence and health outcomes for children with AD.

3.1. Mental Health and Family Dynamics

Parental mental health significantly impacts adherence to treatment regimens in children with atopic dermatitis. Anxiety and depression among parents, especially mothers, are common issues that hinder effective disease management. Mothers often report feelings of exhaustion, helplessness, and guilt, contributing to increased anxiety and depression [2] [9]. The cyclical nature of mental health issues can further deteriorate the caregiver’s ability to manage the child’s condition effectively. The emotional burden associated with these mental health issues often leads to lapses in administering necessary medications, resulting in suboptimal disease management. For example, frequent nighttime wakings caused by uncontrolled itching often leads parents to co-sleep with their children, adding to their stress and emotional burden [10].

Family dynamics also play a crucial role in treatment adherence. Lack of support within the family, especially in single-parent households, can hinder the

establishment and maintenance of effective treatment routines. Children with AD from these single-parent households often have worse outcomes than those from two-parent households [11]. However, even in two-parent households, communication issues can complicate adherence efforts, leading to missed doses or improper application of treatments. Inconsistent messaging and disagreements on treatment approaches can undermine the establishment of a reliable care routine.

Children with atopic dermatitis often face emotional and behavioral challenges, such as embarrassment and frustration over their condition. These challenges, along with fear and resistance to treatment due to perceived discomfort, can lead to non-adherence. Cohort studies have shown that children with AD have more behavioral problems than their unaffected peers, particularly when the disease is severe [12]. Interventions that address these emotional and behavioral aspects are crucial for improving treatment adherence and achieving better health outcomes for children with atopic dermatitis.

3.2. Socioeconomic Factors

Adherence to atopic dermatitis treatment regimens is frequently compromised by socioeconomic factors that extend beyond the clinical setting. Financial constraints, such as the high cost of medications and treatments, can be prohibitive for many families. The economic burden is worsened by frequent healthcare visits, straining household budgets and limiting access to consistent care. Impaired access to healthcare resources and varying levels of health literacy also hinder adherence. Patient education has been associated with improvement in quality of life in various chronic diseases, yet lower health literacy can decrease the ability to navigate the healthcare system effectively [13]. A cross-sectional study reported that 32.4% of AD patients had limited health literacy, which was associated with decreased quality of life [14]. This relationship between socioeconomic status, psychosocial stressors, and cultural beliefs impacts the accessibility and utilization of treatment options.

3.3. Access to Specialized Care

Limited access to healthcare services, particularly in underserved communities, poses another barrier to treatment adherence. Geographic barriers in rural areas restrict access to specialized dermatology care, forcing families to travel long distances at a significant cost. The lack of public transportation options in these areas exacerbates the issue. A study by Pan *et al.* showed that treatment adherence was significantly lower in rural areas (23.88%) compared to urban areas (36.59%) among Chinese hypertensive individuals, highlighting similar disparities in chronic diseases like AD [15]. Even in urban settings, access to dermatologists knowledgeable about pediatric AD may be limited. In the United States, there are around 3.4 dermatologists per 100,000 individuals, fewer than required for adequate treatment [16]. Without regular and timely access to

specialized care, continuous care essential for children with atopic dermatitis—such as monitoring disease progression, adjusting treatment plans, and providing education to patients and their families—is compromised.

Addressing these multifaceted barriers to treatment adherence is crucial for improving health outcomes in pediatric atopic dermatitis. Adherence remains a significant concern in the treatment of chronic diseases, particularly in dermatology. For example, in Denmark, approximately one-third of participants did not redeem their treatments in dermatology clinics [17]. Reported adherence rates of 40% for five days and 32% for eight weeks have been observed in AD [18] [19]. In the United States, around 1 to 3.8 billion dollars are spent each year on the treatment of AD [20] [21]. The costs of treatments such as topical corticosteroids, moisturizers, and other prescribed medications, can be prohibitive over long durations and are often not covered by health insurance. Cost issues can significantly impact the amount of treatments used; for example, patients may use creams more sparingly to postpone refills [22]. Furthermore, delays or denials associated with prescriptions are common. In a study of 978 participants with AD, there were 645 delays or denials associated with prescriptions in the United States, with 48.1% of respondents experiencing at least one delay or denial in the last year [23]. Addressing psychosocial, familial, and socioeconomic barriers remains crucial for advancing the treatment of pediatric atopic dermatitis and improving adherence and health outcomes for affected children.

3.4. Interventions Targeting Psychosocial Barriers

Atopic dermatitis significantly impacts physical, emotional, and social well-being. Addressing psychosocial barriers to treatment adherence requires a multidimensional approach integrating both medical and psychosocial interventions including community support programs, family-centered interventions, and psychological support services. Psychosocial factors such as stress, family dynamics, and stigma, often impede adherence to prescribed treatment regimens. Stress-responder patients, in particular, experience increased disease severity during heightened turmoil [24]. Recognizing the critical role of these factors, recent research has focused on developing and implementing interventions that target these psychosocial barriers.

Community support programs provide emotional and practical assistance to families of patients, resulting in significantly improved adherence and overall well-being. These programs often include support groups and resources that assist caregivers in managing the stress associated with their child's condition. Case studies and success stories from these programs highlight their effectiveness, such as the specialized support group described by Lawton *et al.*, which enhanced parental advocacy and personalized care for children with pediatric AD [25]. Through the creation of a specialized support group with connections to national organizations, both parents and patients felt a greater sense of control over the burden of disease. Still, the heart of pediatric AD management lies with the family.

The sensitive age and treatment requirements of these patients necessitate heavy reliance on parents and guardians. Major areas of family impact in pediatric AD include disruptions to sleep patterns, time management, lifestyle changes, social impact, school and daycare, family activities, financial burdens, and personal strain [20]. Quality-of-life assessment tools, as suggested by Senra *et al.*, can measure and track these impacts [26]. Family-centered interventions strengthen support systems within families and improve communication, creating a more supportive and coordinated environment for managing AD. Highlighting the cost-effectiveness of different treatment regimens can also help reduce economic burden and associated stress [25]. Acknowledging the burden experienced by families improves trust, confidence, and treatment consistency.

Integrating psychological support services into dermatology treatment is crucial in improving treatment outcomes. Mental health issues in pediatric AD patients span multiple domains, including attention, conduct, emotions, and peer relationships. Counseling and therapy sessions help manage the emotional challenges associated with AD, while incorporating mental health into treatment plans helps to manage anxiety and depression in both parents and children. A recent survey published by Wan *et al.* describes a stark underutilization of mental health services in those suffering from the symptoms mentioned above [27]. They primarily attribute this finding to a general lack of recognition of the mental health burden seen in patients with pediatric AD. Quick screenings and interdisciplinary care with primary and psychiatric physicians may help identify patients in need more efficiently. Increasing awareness and training among dermatologists regarding the psychological aspects of AD for a holistic approach to care.

3.5. Interventions Targeting Socioeconomic Barriers

Addressing socioeconomic barriers to treatment adherence in children with atopic dermatitis is integral in achieving equitable health outcomes. Financial aid programs, such as subsidies for medications and treatments, are vital in reducing the economic burden faced by families, making treatments more affordable and accessible. One study examining socioeconomic factors in AD outcomes reported found that there were significant differences in management between socioeconomic groups, indicating a need for financial support programs [28]. Higher socioeconomic status (SES) is associated with increased AD prevalence, while lower SES correlates with more severe disease and poorer outcomes [29]. Financial aid programs targeting lower SES families may level the playing field and improve outcomes for disadvantaged children with AD. Examples include direct financial assistance, discounts, and vouchers for treatments, as well as programs like Medicaid and Children's Health Insurance Program (CHIP) in the United States, which provide coverage for children from low SES families. Implementing subsidies for essential medications and treatments will help bridge the gap in equity and ensure that children from all socioeconomic backgrounds have access to proper care.

3.6. Integrated Care Models

Integrated care models combine the efforts of psychologists, social workers, educators, and medical professionals to address the complex needs of pediatric atopic dermatitis patients facing socioeconomic challenges. These models recognize that effective AD management extends beyond medical treatment and requires a comprehensive approach to address various social determinants of health. A systematic review of existing literature on pediatric AD prevalence rates in low- and middle-income countries highlighted the importance of considering cultural, socioeconomic, and transportation barriers in AD management [30]. This underscores the need for tailored interventions that respect cultural nuances and address the unique barriers faced by these populations. Potential solutions include training healthcare workers in cultural competency, developing community based-education programs to improve health literacy, and creating transportation networks to facilitate access to care. Policy-level changes are also necessary to support infrastructure improvements and resource allocation in these underserved areas.

Integrated care models provide support in areas such as educational resources, nutritional support, housing assistance, and transportation assistance to medical appointments. By addressing these socioeconomic factors alongside medical treatment, integrated care models can potentially lead to better disease control and improved quality of life for children with AD [21] [24] [29]. Incorporating services such as social work, financial counseling, and community resources into the healthcare plan helps mitigate barriers related to cost, access, and support. Future programs must optimize these interventions ensuring they are accessible and effective for diverse populations.

3.7. Telehealth and Mobile Health Solutions

Telehealth and mobile health solutions have also emerged as valuable tools in improving access to care for children with atopic dermatitis. These technologies bridge the gap created by geographic and logistical barriers, allowing families in underserved areas to receive timely and specialized care. Telehealth consultations and mobile health applications provide convenient platforms for monitoring and managing AD, reducing the need for frequent in-person visits and facilitating more continuous care and follow-ups. Current research on eHealth interventions for low SES populations offers valuable insights that can be applied to pediatric AD patients. A scoping review by Al-Dharir *et al.* identified various eHealth delivery methods, including websites, email and texts, social media platforms, and smartphone apps, as effective in engaging patients with low SES when combined with medical services [31]. Providing digital literacy training as a part of eHealth programs can further enhance the effectiveness and accessibility of these interventions.

Efficacy evaluations demonstrate the effectiveness and feasibility of digital health solutions in pediatric atopic dermatitis. A one-year randomized clinical trial conducted in underserved areas showed that telehealth yielded equivalent

outcomes to in-office visits [32]. This highlights telehealth's potential to offer quality care comparable to traditional visits, reduce the burden on healthcare facilities, and increase efficiency. Several reviews support telehealth's accuracy and accessibility in dermatology, demonstrating its reliability in diagnosing and managing conditions like AD, where continuous monitoring is essential [33] [34]. By integrating digital health into routine care, dermatologists cannot only provide more personalized and tailored plans, but also more flexible ones, to address each patient's ever-changing needs.

Telehealth also expands access to medical providers. For example, an 8-month-old Cambodian girl received medical care from dermatologists in the United States in collaboration with her local providers, resulting in a more accurate diagnosis and care plan [35]. This case underscores the potential of telehealth to bridge significant geographical barriers across continents, enabling patients in remote areas to benefit from expert medical advice that would otherwise be inaccessible. This collaborative approach can seek to foster international partnerships, improving global healthcare outcomes. However, barriers such as access to technology and internet, technical difficulties, and challenges with technology literacy remain. Addressing these issues critical for maximizing the potential benefits of telehealth solutions in pediatric atopic dermatitis management.

3.8. Evaluations of Interventions

Evaluating interventions in the treatment of pediatric atopic dermatitis is crucial for advancing clinical practices and improving patient outcomes. The efficacy and sustainability of interventions are influenced by factors such as adherence, accessibility, and patient and caregiver education. Recent studies have introduced various strategies aimed at optimizing treatment adherence and managing symptoms, yet systematic evaluations of these strategies remain essential. A range of study designs, including randomized controlled trials (RCTs), longitudinal studies, and observational research, are used to assess outcomes. Key criteria for evaluating the success of interventions include consistency in treatment adherence, reduction in symptom severity, and the overall well-being of the children and their families. For example, Bass *et al.* conducted a systematic review of clinical trials focused on improving treatment adherence in AD, assessing seven studies that utilized interventions such as written eczema action plans and education-based features [36]. These studies used the SCORAD (scoring of atopic dermatitis) index and quality-of-life scores, but variability in methods posed limitations [36]. Standardizing metrics in these studies could enhance comparability of results and provide clearer insights into the most effective strategies.

Similarly, a systematic review by Ersser *et al.* included ten RCTs, nine of which involved educational interventions primarily directed at parents, with only one focusing on psychological intervention for the children [37]. Due to a lack of data and the inability to perform data synthesis, a meta-analysis of study outcomes was not possible. Similar to the review by Bass *et al.*, outcome measurements included the SCORAD index as a primary outcome measure, with additional outcomes

such as global assessment, sleep improvement, and quality of life. A substantial weakness found in the studies evaluated was the lack of detailed discussion on interventions, making replication difficult and reducing the generalizability of findings. Improving the methodological rigor and sample sizes in future studies will enhance the reliability of these findings.

One of the few studies involving a psychological intervention for pediatric AD, conducted by Sokel *et al.*, examined the benefits of hypnotherapy and biofeedback strategies on disease severity [38]. However, the study utilized a non-validated severity measure, where a dermatologist assessed disease severity by scoring 0 - 3 across twenty body zones for erythema, surface damage, and lichenification. Although some improvement in disease severity was observed, the evidence supporting psychological interventions in pediatric AD requires further investigation to support their application in patient care.

A recurring theme in literature reviews on interventions for pediatric patients with AD is the variability among interventions, making it difficult to compare effectiveness and assess their impact on health-related quality of life, treatment adherence, and disease severity. Education-based approaches appear to offer benefits, particularly in improving disease severity [39]. However, variations in sample size, endpoints, modality, length and frequency of educational sessions complicate the establishment of standardized treatment guidelines [39]. Developing standardized protocols for these studies will facilitate more consistent and reliable comparisons of treatment outcomes in pediatric AD.

Case studies and clinical trials provide concrete examples of successful interventions. For instance, a quality-improvement investigation on implementing an eczema action plan (EAP), hypothesizing that it would improve parental confidence in managing eczema flares [40]. Despite limitations, including a small sample size of 35 patients, and the use of unvalidated measures such as self-reporting, the study achieved 100% retention of patients who completed surveys at baseline and post-EAP implementation. Their findings were promising, with parents' self-rating of their child's eczema severity improving from 51% (severe) and 46% (moderate) at baseline to 57% (mild), 40% (moderate), and 3% (severe) in follow-up surveys. Additionally, 86% of parents found the EAP helpful, and though not proving causality, 68% believed the EAP contributed to the improvement in severity. Quantitative results from such studies often indicate higher adherence rates and reduced disease severity, while qualitative data highlight positive experiences, including enhanced coping strategies and reduced stress levels. Future investigations on the clinical utility of tools like EAPs would benefit from objective measures like the SCORAD index or Eczema Area and Severity Index (EASI). Evaluations of interventions are essential to identify effective strategies, improve treatment adherence, and ultimately enhance the quality of life for children with atopic dermatitis.

3.9. Implications for Clinical Practice

The implications for clinical practice are profound, suggesting that a more holistic

and integrated approach to treating atopic dermatitis could enhance adherence and outcomes. Dermatology clinics should incorporate support services that address both psychosocial and socioeconomic barriers. Embedding mental health care within dermatological settings can provide crucial psychological support for families coping with the challenges of AD. Additionally, providing financial counseling and connecting families with community resources can help mitigate the economic burdens that prevent consistent treatment adherence. Financial counselors can assist with navigating insurance coverage, accessing financial aid programs, and managing out-of-pocket costs, while community resources like transportation assistance and support groups add further layers of support. These integrated services create a more supportive environment, ultimately leading to better health outcomes for children with atopic dermatitis.

Policy recommendations emerging from these findings emphasize the need for systemic changes to support adherence. Health policies should advocate for increased funding for community support programs and financial aid for medications and treatments. Allocating resources to these areas can reduce the financial burden on families and improve access to necessary treatments. Additionally, expanding telehealth services can address geographic barriers, providing continuous care for children in underserved areas and facilitating timely intervention and management of AD. Moreover, policies should promote the integration of social services with medical care to ensure a comprehensive approach to managing AD that includes mental health support, financial counseling, and access to community resources. Such policy changes can create a healthcare environment that effectively supports families and promotes adherence to treatment regimens, ultimately leading to better health outcomes and improved quality of life for children with atopic dermatitis.

3.10. Limitations and Gaps in Current Research

Despite promising findings, this review identifies several limitations and gaps in current research that warrant further investigation. A significant limitation is the variability in study designs and populations, which complicates the generalization of results across different contexts. Many studies are limited to specific populations or settings, making it difficult to apply their findings to broader, more diverse groups. For instance, studies conducted in high-income countries may not fully capture the challenges faced by families in low- and middle-income countries, where access to healthcare and financial resources are often more limited. Another critical limitation is the short duration of many studies, which fails to capture the long-term effectiveness of interventions. Longitudinal studies are needed to understand how these interventions sustain adherence and health outcomes over time. Moreover, the lack of rigorous and standardized methodologies in evaluating interventions undermines the reliability of findings. Consistent outcome measures and criteria for success are necessary to facilitate comparisons across studies and strengthen the evidence base.

Finally, current research often overlooks broader social determinants of health, such as education and employment status, which play a crucial role in treatment adherence. Addressing these methodological issues and expanding the scope of research to include diverse populations and settings will enhance our understanding of effective strategies for managing atopic dermatitis. A comprehensive approach to research is essential to develop interventions that meet the needs of all children affected by AD, regardless of their socioeconomic or cultural background.

3.11. Areas for Future Directions

Inadequate treatment adherence significantly hinders clinical improvement in patients with atopic dermatitis, yet literature on strategies to enhance adherence remains limited [36]. Future efforts must focus on refining and adapting existing interventions to suit various socioeconomic and cultural contexts. Customization is essential, as interventions that work well in one population or setting may not be as effective in another. Developing culturally sensitive approaches that respect the values, beliefs, and practices of diverse communities can enhance the relevance and acceptance of these interventions. Additionally, scalable and sustainable models are needed, adaptable to different healthcare systems without losing effectiveness. This approach ensures that successful interventions can reach a broader patient population, regardless of location or economic status.

Expanding research efforts is crucial for building a robust evidence base to support effective interventions. Larger, multi-center studies are needed to provide more generalizable data and to understand how interventions perform across different populations and settings. Standardized methodologies should be employed to facilitate comparison and replication, and longitudinal data collection should be prioritized to assess the sustainability of adherence-promoting strategies over time [41]. Moreover, innovative intervention strategies, such as smartphone applications for medication reminders and virtual consultations, offer promise in overcoming barriers related to time, transportation, and access to specialists [42]. Additionally, education tailored to both patients and caregivers is essential in improving clinical outcomes and quality of life for pediatric patients. Future research should focus on developing and evaluating accessible and culturally sensitive education programs that enhance understanding of AD management and the importance of consistent treatment adherence [41].

Interdisciplinary collaboration is essential to addressing the multifaceted nature of treatment adherence barriers. Integrating expertise from dermatology, psychology, social work, and public health can create comprehensive care models that address the full spectrum of challenges faced by families managing AD. Dermatologists can optimize medical treatment plans, psychologists can provide mental health, social workers can help navigate socioeconomic barriers, and public health professionals can design community-based interventions. Future studies should explore the efficacy of psychological interventions, such as cognitive-

behavioral therapy and stress management techniques, in improving adherence. Faught *et al.* suggested that cognitive reappraisal of stressful events may lessen their impact [43]. Assessing the role of supportive social networks and family dynamics may further increase rates of adherence [43]. Such interdisciplinary approaches ensure that all aspects of adherence are considered and addressed.

Advancing treatment adherence for pediatric atopic dermatitis requires refining interventions, expanding research, and fostering interdisciplinary collaboration. Customizing interventions for diverse contexts, exploring innovative solutions, and integrating expertise across disciplines can lead to more effective and sustainable interventions. Engaging communities and leveraging participatory research approaches further ensures that interventions are grounded in the real-world experiences of those affected by AD. These future directions hold promise for creating a more equitable and effective healthcare system, supporting optimal management of atopic dermatitis for all children.

4. Conclusion

Addressing barriers to treatment adherence in children with atopic dermatitis is critical, not only for improving clinical outcomes and enhancing quality of life but also for mitigating healthcare disparities in pediatric populations. Effective management of psychosocial and socioeconomic factors can significantly impact disease control and reduce the burden on patients and their families. The study reveals that parental mental health issues, family dynamics, financial constraints, and limited access to specialized care significantly disrupt treatment adherence, exacerbating the condition. Effective interventions, including community support programs, family-centered approaches, financial aid, integrated care models, and telehealth solutions, show promise in mitigating these barriers and enhancing adherence. By improving parental mental health, family communication, and access to care, these interventions contribute to better health outcomes and quality of life for children with AD. The findings advocate for policy reforms to increase funding for supportive programs and expand telehealth services, emphasizing the need for an integrated model of care that addresses both medical and psychosocial needs. By emphasizing collaboration across multiple disciplines and committing to ongoing research and policy development, we can create a more equitable and effective healthcare system that ensures every child with AD receives the holistic care necessary for optimal health outcomes and improved quality of life.

Conflicts of Interest

The authors declare no conflicts of interest regarding the publication of this paper.

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