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ORIGINAL RESEARCH

Clinical Spectrum of Atopic Dermatitis in Pediatric Age Group from a Tertiary Centre in Eastern Bihar: A Cross-Sectional Study

[1]Dr. Vijay Kumar, [2]Dr. Rashmi Roy, [3]Dr. Suryendru Kumar, [4]Dr. Amita Ranjan, [5]Dr. Nikhil Sagar

[1]Assistant Professor, Department of Pediatrics, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India
[2]Assistant Professor, Department of Dermatology Venereology and Leprosy,Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India
[3]Assistant Professor, Department of Pediatrics, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India
[4]Post Graduate, Department of Paediatrics, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India
[5]Post Graduate, Department of Paediatrics, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India

Corresponding Author
Dr. Vijay Kumar
Assistant Professor, Department of Pediatrics, Lord Buddha Koshi Medical College and Hospital, Saharsa, Bihar, India
Email: dr.vijaykur09@gmail.com

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ABSTRACT

Background: Atopic dermatitis (AD) is a prevalent chronic inflammatory skin condition in children, characterized by pruritus, erythema, and relapsing eczematous lesions. Despite its rising incidence in India, regional data on the clinical spectrum in eastern Bihar remains sparse. This study aimed to assess the clinical patterns, severity, and common triggers of AD in the pediatric population at a tertiary care center. **Materials and Methods:**A hospital-based cross-sectional study was conducted over 12 months at the dermatology &pediatrics outpatient department of a tertiary care hospital in eastern Bihar. A total of 180 children aged 6 months to 14 years clinically diagnosed with AD based on Hanifin and Rajka criteria were included. Detailed history, clinical examination, and scoring using the SCORAD (Scoring Atopic Dermatitis) index were recorded. Data were analyzed using SPSS version 25.0.**Results:**Out of 180 children, 98 (54.4%) were male and 82 (45.6%) were female. The most affected age group was 1–5 years (41.1%), followed by 6–10 years (35.0%). Common clinical features included pruritus (96.6%), xerosis (84.4%), and flexural eczema (62.8%). Mild, moderate, and severe AD were noted in 36.1%, 48.9%, and 15.0% respectively based on SCORAD scoring. Personal or family history of atopy was observed in 64.4% of patients. Common triggers included seasonal variation (51.7%), woolen clothing (28.9%), and food allergens (20.6%).**Conclusion:**Atopic dermatitis is a significant dermatologic concern in children of eastern Bihar, with predominant involvement in early childhood and a considerable burden of moderate-to-severe cases. Early recognition, avoidance of triggers, and parental education are essential for long-term disease control.

Keywords: Atopic dermatitis, Pediatric eczema, SCORAD index, Clinical features, Eastern Bihar, Childhood skin disorders.

INTRODUCTION

Atopic dermatitis (AD), also known as atopic eczema, is one of the most common chronic inflammatory dermatoses affecting the pediatric population globally. It typically begins in early childhood and is characterized by intense itching, dry skin, and eczematous lesions, often exhibiting a relapsing-remitting course (1). AD is considered a primary manifestation of the atopic march, often preceding the development of allergic rhinitis and bronchial asthma (2).

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The global burden of AD has been rising steadily over the past few decades, especially in low- and middle-income countries, including India (3). The prevalence of AD in children varies widely depending on geographical location, environmental factors, genetic predisposition, and socio-economic determinants. Studies estimate the prevalence in Indian children ranges between 10% and 20%, with variations between urban and rural populations (4,5). However, there is a paucity of data focusing specifically on eastern India, including Bihar, which presents unique demographic and environmental conditions influencing the clinical expression of AD.

The pathogenesis of atopic dermatitis is multifactorial, involving complex interactions between genetic susceptibility, epidermal barrier dysfunction, immune dysregulation, and environmental triggers (6). Filaggrin gene mutations, Th2-skewed immune responses, and impaired skin microbiota are some of the major contributors to the disease process (7). Clinically, AD can present in various forms, ranging from mild localized xerosis and erythema to severe widespread lichenified plaques with secondary infections. The morphological presentation may differ across age groups, with infants commonly presenting with facial involvement and older children showing flexural predilection (8).

Several scoring systems are used to assess the severity of AD, among which the SCORAD (Scoring Atopic Dermatitis) index is widely accepted for both clinical and research purposes. It incorporates the extent of skin involvement, intensity of symptoms, and subjective signs such as pruritus and sleep disturbance (9). Evaluating disease severity helps clinicians plan appropriate treatment strategies and monitor therapeutic response over time.

Environmental and lifestyle factors such as seasonal variations, climate, hygiene practices, exposure to allergens, and dietary patterns play a crucial role in precipitating and exacerbating AD flares, particularly in resource-limited settings like rural and semi-urban India (10,11). Children from such backgrounds often lack consistent access to dermatologic care, increasing the likelihood of under diagnosis and suboptimal disease management (12).

A better understanding of the clinical spectrum, demographic patterns, and triggering factors in the local population is essential for developing targeted strategies for early diagnosis and intervention. Despite the significant disease burden, very few studies have addressed the clinical characteristics of pediatric AD in eastern Bihar, a region with its own socio-economic and environmental challenges. Most existing literature focuses on broader national or urban cohorts, thereby overlooking regional disparities in presentation and healthcare access.

Hence, this study aims to evaluate the **clinical spectrum, severity profile, and associated risk factors** of atopic dermatitis in children attending a tertiary care center in eastern Bihar. The findings are expected to provide baseline epidemiological data, support local clinical practice, and help in formulating public health strategies to reduce the burden of pediatric AD in this underserved population.

MATERIALS AND METHODS

Study Design and Setting

This was a hospital-based, observational cross-sectional study conducted over a period of 12 months, from March 2024 to February 2025. The study was carried out in the Department of Dermatology &Pediatrics at a tertiary care teaching hospital in eastern Bihar, catering to both rural and semi-urban populations.

Study Population

The study enrolled pediatric patients aged 6 months to 14 years presenting with clinical features suggestive of atopic dermatitis. Diagnosis was established based on the modified Hanifin and Rajka criteria, which includes major features like pruritus, chronic relapsing dermatitis, personal/family history of atopy, and flexural lichenification.

Inclusion Criteria

- Children aged 6 months to 14 years
- Newly diagnosed or previously untreated cases of atopic dermatitis
- Willingness of parents/guardians to provide informed consent

Exclusion Criteria

- Children with other chronic skin diseases mimicking eczema (e.g., seborrheic dermatitis, contact dermatitis, psoriasis)
- Patients currently on systemic immunosuppressive therapy
- Uncooperative children or those with incomplete clinical records

Sample Size and Sampling Technique

A total of 180 eligible participants were enrolled through convenience sampling over the study period. All children attending the dermatology outpatient department who met the eligibility criteria and consented to participate were included.

Data Collection Procedure

After obtaining written informed consent from the parents or legal guardians, a detailed clinical evaluation was performed. A structured proforma was used to record the following:

- Demographic details (age, sex, residence)
- Age of onset, disease duration, family history of atopy

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- Commonly reported triggers (e.g., seasonal variation, clothing, food allergens)
- Distribution and morphological patterns of skin lesions
- History of associated allergic conditions (e.g., asthma, allergic rhinitis)

Assessment of Disease Severity

The severity of atopic dermatitis was assessed using the SCORAD (Scoring Atopic Dermatitis) index. This composite index considers the extent of body surface involvement, intensity of skin signs (erythema, edema/papulation, excoriation, lichenification, dryness), and subjective symptoms like itching and sleep disturbance. Based on the total SCORAD score, the disease was categorized as:

- Mild: <25
- Moderate: 25–50
- Severe: >50

Statistical Analysis

All collected data were entered into Microsoft Excel and analyzed using SPSS software version 25.0 (IBM Corp., Armonk, NY, USA). Descriptive statistics were applied to summarize demographic and clinical characteristics. Categorical variables were expressed as frequencies and percentages. Associations between disease severity and demographic or clinical parameters were evaluated using Chi-square tests or Fisher's exact test, where applicable. A *p*-value <0.05 was considered statistically significant.

RESULTS

A total of 180 children diagnosed with atopic dermatitis were included in the study. The cohort consisted of 98 males (54.4%) and 82 females (45.6%), with a male-to-female ratio of 1.2:1. The most affected age group was 1–5 years, comprising 74 cases (41.1%), followed by 6–10 years (63 cases; 35.0%), and 11–14 years (43 cases; 23.9%).

A personal or family history of atopic conditions such as allergic rhinitis or bronchial asthma was noted in 116 children (64.4%). The mean age of disease onset was 2.9 ± 1.4 years. The majority of children presented with generalized itching (96.6%), xerosis (84.4%), and erythematous papules or plaques (73.3%). The flexural areas (popliteal and antecubital fossae) were the most commonly involved sites, seen in 113 patients (62.8%), followed by the face (38.9%) and trunk (24.4%) (Table 1).

Table 1. Distribution of Clinical Features and Common Sites of Involvement (n = 180)

Clinical Feature / Site Involved	Frequency (n)	Percentage (%)
Pruritus (Itching)	174	96.6%
Xerosis (Dry Skin)	152	84.4%
Erythematous Papules/Plaques	132	73.3%
Excoriation	106	58.9%
Lichenification	88	48.9%
Facial Involvement	70	38.9%
Flexural Areas (Knees, Elbows)	113	62.8%
Trunk Involvement	44	24.4%
Periorbital or Eyelid Eczema	32	17.8%

The severity of atopic dermatitis, as measured using the SCORAD index, revealed that 65 children (36.1%) had mild disease, 88 (48.9%) had moderate severity, and 27 (15.0%) exhibited severe disease. A statistically significant correlation was observed between earlier age of onset and higher severity scores ($p< 0.05$).

Environmental and lifestyle triggers were identified in 142 patients (78.9%). Seasonal variation, especially during winter months, was the most commonly reported aggravating factor (51.7%), followed by woolen clothing (28.9%) and food allergens (20.6%). Use of irritant soaps and inadequate moisturization were also frequently associated with symptom exacerbation (Table 2).

Table 2. Commonly Reported Aggravating Factors among Study Participants (n = 180)

Aggravating Factor	Number of Patients	Percentage (%)
Seasonal Changes (Winter/Summer)	93	51.7%

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Woolen Clothing	52	28.9%
Food Allergens (e.g., milk, nuts)	37	20.6%
Dust Exposure	34	18.9%
Use of Irritant Soaps	29	16.1%
Passive Smoking Exposure	21	11.7%

In terms of comorbid conditions, allergic rhinitis was present in 21 patients (11.7%), and bronchial asthma was noted in 17 children (9.4%). Sleep disturbances due to nocturnal itching were reported by 96 children (53.3%), significantly affecting their quality of life and daily functioning.

Overall, the study findings indicate a moderate disease burden in the pediatric population with significant clinical variation and influence of modifiable environmental factors (Tables 1 and 2).

DISCUSSION

This cross-sectional study aimed to delineate the clinical spectrum and contributing factors associated with atopic dermatitis (AD) in children attending a tertiary care center in eastern Bihar. The findings provide region-specific insights into the burden, presentation, and severity of pediatric AD in a semi-urban and rural population.

The study demonstrated a slight male predominance (M:F ratio 1.2:1), consistent with earlier reports indicating higher prevalence in boys during early childhood (1,2). The most affected age group in our study was 1–5 years, which aligns with the known early onset of AD in most cases (3). Several studies from India and abroad have similarly documented the peak incidence in the first five years of life (4,5).

Pruritus was nearly universal (96.6%) among participants and continues to be the most distressing symptom associated with AD, corroborating findings from both Indian and Western cohorts (6,7). Xerosis and flexural involvement, seen in over 80% and 60% of children respectively, reflect the classical eczematous presentation of AD in this age group (8). Our observation of frequent facial involvement in infants and flexural localization in older children mirrors the age-specific clinical morphology reported in earlier dermatological literature (9,10).

The SCORAD index helped stratify disease severity, with moderate cases forming the bulk (48.9%). This distribution is similar to studies from North India and Southeast Asia, where moderate disease remains predominant, though variations exist based on population studied and seasonal factors (11,12). The 15% prevalence of severe disease in our sample highlights the need for timely intervention and caregiver education.

A strong association with atopic diathesis was evident in 64.4% of children, either through personal or family history. This is in line with previous reports emphasizing the genetic and familial clustering of AD with other allergic disorders such as asthma and allergic rhinitis (13). Sleep disturbances due to nocturnal itching, reported in more than half of the patients, emphasize the significant impact of AD on pediatric quality of life, a finding supported by studies worldwide (14,15).

Among environmental triggers, seasonal variation, especially during the winter months, was the most commonly reported factor. This is consistent with research indicating that colder, drier climates exacerbate trans epidermal water loss and compromise skin barrier function (5,16). Woolen clothing, known to irritate sensitive skin, and food allergens were also significant contributors. Similar patterns have been observed in other Indian studies from Kolkata and Bangalore, reinforcing the role of climate and textile exposure (17,18). Additionally, irritant soaps and passive smoke exposure were reported by a smaller yet notable proportion of participants, emphasizing modifiable behavioral risk factors.

Interestingly, our findings point to significant regional commonalities and differences. For instance, the overall clinical pattern aligns with Indian subcontinent data, yet certain environmental aggravators like dietary triggers and use of local irritants may vary across regions depending on cultural practices (19,20). This further justifies the need for localized dermatological data to inform clinical decisions.

From a public health perspective, the relatively high proportion of moderate and severe cases, combined with low awareness about trigger avoidance and preventive care, suggests an urgent requirement for educational interventions targeted at caregivers and primary healthcare providers. The chronic and relapsing nature of AD not only poses treatment challenges but also affects the child's psychological and emotional development, reinforcing the necessity of early and comprehensive management strategies (21,22).

Our study has some limitations. Being cross-sectional, it cannot assess seasonal variations longitudinally. Additionally, data on socioeconomic status and nutritional deficiencies were not explored, which could influence disease expression in slum and semi-urban populations. Nevertheless, it provides a valuable snapshot of the

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pediatric AD burden in eastern Bihar, a relatively underreported region.

CONCLUSION

In conclusion, the study reaffirms that atopic dermatitis is a prevalent and clinically significant pediatric dermatosis in this region. Its impact on daily life, coupled with preventable triggers, highlights the importance of integrated management involving dermatological care, patient education, and environmental modifications.

References

1. Beltrani VS. The clinical spectrum of atopic dermatitis. J Allergy ClinImmunol. 1999 Sep;104(3 Pt 2): S87–98. doi:10.1016/s0091-6749(99)70050-3. PMID: 10482859.
2. Beltrani VS. Suggestions regarding a more appropriate understanding of atopic dermatitis. CurrOpin Allergy ClinImmunol. 2005 Oct;5(5):413–8. doi: 10.1097/01.all.0000182544. 37724.b5. PMID: 16131916.
3. Hunziker T. [Atopic dermatitis]. Schweiz Med Wochenschr. 1997 Mar 8;127(10):390–4. PMID: 9132926. German.
4. Ahn C, Huang W. Clinical presentation of atopic dermatitis. AdvExp Med Biol. 2024; 1447:37–44. doi:10.1007/978-3-031-54513-9_4. PMID: 38724782.
5. Barrett M, Luu M. Differential diagnosis of atopic dermatitis. Immunol Allergy Clin North Am. 2017 Feb;37(1):11–34. doi: 10.1016/j.iac.2016.08.009. PMID: 27886900.
6. Gupta D. Atopic dermatitis: A common pediatric condition and its evolution in adulthood. Med Clin North Am. 2015 Nov;99(6):1269–85, xii. doi: 10.1016/j.mcna.2015.07.006. PMID: 26476252.
7. Kang KF, Tian RM. Criteria for atopic dermatitis in a Chinese population. ActaDermVenereolSuppl (Stockh). 1989; 144:26–7. doi:10.2340/000155551891442627. PMID: 2800903.
8. Liu P, Zhao Y, Mu ZL, Lu QJ, Zhang L, Yao X, et al. Clinical features of adult/adolescent atopic dermatitis and Chinese criteria for atopic dermatitis. Chin Med J (Engl). 2016 Apr 5;129(7):757–62. doi:10.4103/0366-6999.178960. PMID: 26996468.
9. Ballmer-Weber BK. [Atopic dermatitis]. Praxis (Bern 1994). 1998 Sep 30;87(40):1293–9. PMID: 9816922. German.
10. Rystedt I. Hand eczema and long-term prognosis in atopic dermatitis. ActaDermVenereolSuppl (Stockh). 1985; 117:1–59. PMID: 2931938.
11. Tada J, Toi Y, Akiyama H, Arata J. Infra-auricular fissures in atopic dermatitis. ActaDermVenereol. 1994 Mar;74(2):129–31. doi:10.2340/0001555574129131. PMID: 7911619.
12. Saurat JH. Eczema in primary immune-deficiencies. Clues to the pathogenesis of atopic dermatitis with special reference to the Wiskott-Aldrich syndrome. ActaDermVenereolSuppl (Stockh). 1985; 114:125–8. PMID: 3890446.
13. Purvis DJ, Thompson JM, Clark PM, Robinson E, Black PN, Wild CJ, et al. Risk factors for atopic dermatitis in New Zealand children at 3.5 years of age. Br J Dermatol. 2005 Apr;152(4):742–9. doi:10.1111/j.1365-2133.2005.06540. x. PMID: 15840107.
14. Wadonda-Kabondo N, Sterne JA, Golding J, Kennedy CT, Archer CB, Dunnill MG; ALSPAC Study Team. Association of parental eczema, hayfever, and asthma with atopic dermatitis in infancy: birth cohort study. Arch Dis Child. 2004 Oct;89(10):917–21. doi:10.1136/adc.2003.034033. PMID: 15383434.
15. Silverberg NB, Durán-McKinster C. Special considerations for therapy of pediatric atopic dermatitis. DermatolClin. 2017 Jul;35(3):351–63. doi: 10.1016/j.det.2017.02.008. PMID: 28577804.
16. Jenkins D, Cooper SM, McPherson T. Unilateral nipple eczema in children: Report of five cases and literature review. PediatrDermatol. 2015 Sep–Oct;32(5):718–22. doi:10.1111/pde.12612. PMID: 25968418.
17. Eichenfield LF, Hanifin JM, Beck LA, Lemanske RF Jr, Sampson HA, Weiss ST, et al. Atopic dermatitis and asthma: parallels in the evolution of treatment. Pediatrics. 2003 Mar;111(3):608–16. doi:10.1542/peds.111.3.608. PMID: 12612244.
18. Naleway AL, Belongia EA, Greenlee RT, Kieke BA Jr, Chen RT, Shay DK. Eczematous skin disease and recall of past diagnoses: implications for smallpox vaccination. Ann Intern Med. 2003 Jul 1;139(1):1–7. doi:10.7326/0003-4819-139-1-200307010-00006. PMID: 12834312.
19. Pugliarello S, Cozzi A, Gisondi P, Girolomoni G. Phenotypes of atopic dermatitis. J DtschDermatolGes. 2011 Jan;9(1):12–20. doi:10.1111/j.1610-0387.2010.07508. x. PMID: 21054785.
20. Galaup B. [Clinical diagnosis of atopic dermatitis]. AllergImmunol (Paris). 1992 May;24(5):164–7. PMID: 1637486. French.
21. Schimke LF, Sawalle-Belohradsky J, Roesler J, Wollenberg A, Rack A, Borte M, et al. Diagnostic approach to the hyper-IgE syndromes: immunologic and clinical key findings to differentiate hyper-IgE syndromes from atopic dermatitis. J Allergy ClinImmunol. 2010 Sep;126(3):611–7. e1. doi: 10.1016/j.jaci.2010.06.029. PMID: 20816194.
22. Kang KF, Tian RM. Atopic dermatitis. An evaluation of clinical and laboratory findings. Int J Dermatol. 1987 Jan–Feb;26(1):27–32. doi:10.1111/j.1365-4362. 1987.tb04572. x. PMID: 3557788.