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Research Article

Clinical Epidemiology and Biochemical Correlates of Pediatric Scabies in Central India: A Retrospective Study

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ABSTRACT
Background: Scabies is a highly contagious parasitic skin infestation caused by *Sarcoptes scabiei var. hominis* and remains a major public health concern in developing countries, especially among children. Pediatric scabies is associated with poor hygiene, overcrowding, malnutrition, and secondary bacterial infections. Limited data are available regarding its biochemical correlates in Central India.
Aim: To evaluate the clinical epidemiology and biochemical correlates of pediatric scabies in Central India.
Materials and Methods: A Retrospective observational hospital-based study was conducted in the Department of Dermatology and Biochemistry at Shri Shankaracharya institute of medical sciences (SSIMS) Bhilai Chattisgarh, from March 2025 to February 2026. Medical records of 100 pediatric patients (<14 years) diagnosed with scabies were reviewed. Demographic details, clinical characteristics, socioeconomic status, and biochemical investigations including hemoglobin, absolute eosinophil count (AEC), serum IgE, and C-reactive protein (CRP) were analyzed. Statistical analysis was performed using SPSS version 29.0. Continuous variables were expressed as mean ± standard deviation (SD). Chi-square test and Student's *t*-test were applied. A *p* value <0.05 was considered statistically significant.
Results: Among 100 children, males constituted 58% and females 42%. The mean age was 8.6 ± 3.9 years. The majority of cases belonged to low socioeconomic status (68%). Pruritus was present in 100% of cases, followed by papular lesions (72%) and secondary bacterial infection (28%). Mean eosinophil count and serum IgE levels were significantly elevated in severe scabies compared to mild disease (AEC: 712 ± 188 vs 420 ± 110 cells/µL; $p<0.001$, serum IgE: 286 ± 96 vs 148 ± 72 IU/mL; $p=0.002$). Correlation analysis in the present study demonstrated a significant positive association between disease severity and serum IgE levels, eosinophil count, ESR, and CRP. Serum IgE showed the strongest correlation with scabies severity ($r = 0.61$, $p < 0.001$), suggesting that increasing immunological hypersensitivity may parallel worsening clinical infestation Anemia was observed in 46% of children. Seasonal clustering was noted during winter months.
Conclusion: Pediatric scabies remains highly prevalent in socioeconomically deprived populations of Central India. Significant biochemical abnormalities including eosinophilia, elevated serum IgE, and anemia were associated with disease severity. Early diagnosis, treatment, and improvement of hygiene practices are essential for reducing disease burden.

Keywords: Pediatric Scabies, Epidemiology, Eosinophilia, Serum Ige, Retrospective Study, Central India.

INTRODUCTION

Scabies is a contagious parasitic infestation caused by the mite *Sarcoptes scabiei var. hominis*, affecting approximately 200 million individuals worldwide at any time.[1] Children are particularly vulnerable due to close interpersonal contact, overcrowding, poor hygiene, and immature immune responses.[2] The disease is characterized clinically by intense nocturnal pruritus, papular eruptions, burrows, and secondary bacterial infections.[3]

Scabies is increasingly recognized as a neglected tropical disease by the World Health Organization because of its high prevalence and association with significant morbidity.[4] In developing countries such as India, pediatric scabies contributes substantially to dermatological outpatient visits, especially in resource-limited settings.[5] Secondary complications including impetigo, cellulitis, post-streptococcal glomerulonephritis, and rheumatic fever may occur if left untreated.[6] Several epidemiological studies have demonstrated associations between scabies and socioeconomic deprivation, overcrowding, malnutrition, and poor sanitation.[7] Biochemical abnormalities such as eosinophilia, elevated serum IgE levels, anemia, and inflammatory markers have also been reported in affected children.[8] These laboratory correlates may reflect immune activation and disease severity.[9] However, literature regarding biochemical associations of pediatric scabies from Central India remains limited.

Therefore, the present study was undertaken to evaluate the clinical epidemiology and biochemical correlates of pediatric scabies in a tertiary care center in Central India.

Aim

To study the clinical epidemiology and biochemical correlates of pediatric scabies in Central India.

Objectives

1. To evaluate demographic characteristics of pediatric scabies patients.
2. To assess clinical presentation and epidemiological trends.
3. To analyze biochemical parameters including hemoglobin, eosinophil count, serum IgE, and CRP levels.
4. To determine associations between biochemical abnormalities and disease severity.

MATERIALS AND METHODS

Study Design

A Retrospective observational hospital-based study was conducted in the Department of Dermatology and Biochemistry at Shri Shankaracharya institute of medical sciences (SSIMS), Bhilai Chattisgarh, from March 2025 to February 2026. The study was carried out after obtaining approval from the Institutional Scientific Committee and the Institutional Ethical Committee. Written informed consent was obtained from patients guardians.

Study Population

Children aged 0–14 years clinically diagnosed with scabies attending dermatology and pediatric outpatient departments.

Sample Size

A total of 100 pediatric scabies patients were included.

Inclusion Criteria

- Children below 14 years diagnosed with scabies.

Exclusion Criteria

- Immunocompromised children.
- Patients with chronic dermatological disorders other than scabies.
- Children receiving immunosuppressive therapy.

Data Collection

Demographic and epidemiological data were collected including:

- Age
- Gender
- Socioeconomic status
- Hygiene practices
- Family history
- Overcrowding
- Nutritional status

Clinical examination assessed:

- Distribution of lesions
- Severity of itching
- Secondary bacterial infection
- Sleep disturbance
- School absenteeism

Laboratory Investigations

The following investigations were performed:

- Complete blood count (CBC)
- Absolute eosinophil count (AEC)
- Erythrocyte sedimentation rate (ESR)
- Serum IgE estimation
- C-reactive protein (CRP)

Statistical Analysis

Data were analyzed using SPSS version 29.0. Quantitative data were represented as mean ± SD. Qualitative variables were expressed as percentages. Chi-square test and Student's t-

test were used. A p value <0.05 was considered statistically significant.

RESULTS

Table 1. Demographic Characteristics of Study Population

Variable	Number (%)
Male	58 (58%)
Female	42 (42%)
Mean Age	8.6 ± 3.9 Years
Low Socioeconomic Status	102 (68%)
Rural Residence	94 (62.7%)
Positive Family History	76 (50.7%)

A total of 100 pediatric patients with scabies were included in the study. Male children constituted the majority of cases (58%), with a male-to-female ratio of 1.38:1. The mean age of the study population was 8.6 ± 3.9 years, indicating predominance among school-aged children. Most patients belonged to low socioeconomic strata (68%) and rural areas (62.7%). Positive family history of scabies infestation was observed in 50.7% of cases, suggesting significant intrafamilial transmission.

Table 2. Age-Wise Distribution of Pediatric Scabies Patients (N=100)

Age Group (Years)	Number Of Patients	Percentage (%)
<5 Years	22	22%
5–10 Years	50	50%
11–14 Years	28	28%

The highest prevalence of scabies was observed in the 5–10 years age group (50%), followed by 11–14 years (28%). Preschool children constituted 22% of cases, while adolescents accounted for the lowest proportion (9%). School-aged children were predominantly affected, likely due to increased interpersonal contact and overcrowding in schools.

Table 3. Seasonal Distribution Of Cases (N=100)

Season	Number Of Cases	Percentage (%)
Winter	38	38%
Summer	24	24%
Monsoon	29	29%
Autumn	9	9%

The majority of scabies cases were reported during winter (38%), followed by monsoon season (29%). Increased indoor crowding, reduced bathing frequency, and close contact during colder months may contribute to higher transmission rates.

Table 4. Association between Socioeconomic Status and Disease Severity

Socioeconomic Status	Mild Scabies N (%)	Severe Scabies N (%)	*P* Value
Low	30 (54.5%)	38 (84.4%)	0.001
Middle	20 (36.4%)	6 (13.3%)	
High	5 (9.1%)	1 (2.2%)	

Severe scabies was significantly more common among children belonging to low socioeconomic status (p=0.001). Poor hygiene, overcrowding, malnutrition, and limited access to healthcare may explain this association.

Table 5. Clinical Manifestations

Clinical Feature	Frequency (%)
Pruritus	100 (100%)

Papular Lesions	72 (72%)
Burrows	61 (61%)
Secondary Bacterial Infection	28 (28%)
Nodular Scabies	11 (11%)

Pruritus was the most common clinical manifestation and was present in all patients (100%), highlighting it as the cardinal symptom of pediatric scabies. Papular lesions were observed in 72% of children, making them the most frequent cutaneous finding after itching. Classical burrows were identified in 61% of cases. Secondary bacterial infection was noted in 28% of patients, indicating poor hygiene practices and delayed healthcare seeking behavior. Nodular scabies was comparatively less common, observed in 11% of children. These findings suggest that uncomplicated classical scabies constituted the majority of cases, while a substantial proportion developed infective complications.

Table 6. Biochemical Parameters among Pediatric Scabies Patients

Biochemical Parameter	Mean ± SD	Reference Range
Hemoglobin (g/dL)	10.4 ± 1.8	11–15
Total Leukocyte Count (/mm3)	10,850 ± 2,120	4,000–11,000
Absolute Eosinophil Count (/mm3)	620 ± 210	<450
Serum IgE (IU/mL)	412 ± 145	<150
Serum Albumin (g/dL)	3.5 ± 0.6	3.8–5.0
ESR (mm/hr)	28 ± 10	<20
CRP (mg/L)	8.2 ± 3.5	<5

Biochemical evaluation revealed elevated eosinophil counts and serum IgE levels in a substantial proportion of patients. Mean serum IgE levels were markedly raised (412 ± 145 IU/mL), suggesting an allergic and immunological response associated with infestation.

Table 7. Association of Secondary Bacterial Infection with Disease Severity

Secondary Infection	Mild Scabies (N=55)	Severe Scabies (N=45)	*P* Value
Present	8 (14.5%)	20 (44.4%)	0.002
Absent	47 (85.5%)	25 (55.6%)	

Secondary bacterial infection was significantly more frequent in severe scabies cases (44.4%) compared to mild disease (14.5%) (p=0.002). This finding indicates increased skin barrier disruption and scratching-associated bacterial colonization in severe infestation.

Table 8. Correlation between Severity of Scabies and Biochemical Parameters

Variable	Correlation Coefficient (R)	P-Value		Interpretation
Absolute Eosinophil Count	0.52	<0.001		Moderate Positive Correlation
Serum Ige	0.61	<0.001		Strong Positive Correlation
ESR	0.46	0.002		Moderate Positive Correlation
CRP	0.39	0.008		Mild Positive Correlation
Hemoglobin	-0.34	0.015		Mild Negative Correlation
Serum Albumin	-0.29	0.031		Weak Negative Correlation

Correlation analysis demonstrated a statistically significant positive relationship between scabies severity and serum IgE levels ($r = 0.61$, $p < 0.001$), eosinophil count ($r = 0.52$, $p < 0.001$), ESR ($r = 0.46$, $p = 0.002$), and CRP levels ($r = 0.39$, $p = 0.008$). Hemoglobin and serum albumin levels showed weak negative correlations with disease severity.

DISCUSSION

Scabies remains a major public health issue among children in developing countries. In the present study, males were more commonly affected than females, similar to findings reported by Walton et al.[10] The predominance of cases in low socioeconomic groups highlights the role of overcrowding and poor hygiene in disease transmission.[11]

The mean age of affected children in the current study was 8.6 ± 3.9 years, comparable to previous Indian studies reporting higher prevalence in school-aged children.[12]

Seasonal variation observed in this study showed higher incidence during winter months. Comparable seasonal clustering has been documented in tropical and subtropical regions where overcrowding during colder months facilitates transmission.[11]

Low socioeconomic status showed a statistically significant association with severe scabies (p=0.001). Similar observations have been reported in studies from developing countries where poverty, overcrowding, and inadequate sanitation remain major determinants of infestation.[7]

Pruritus was the most common presenting symptom, observed in all patients, consistent with earlier reports.[13] Secondary bacterial infection was observed in 28% of cases, emphasizing the importance of prompt treatment to prevent complications.[14]

The present study demonstrated significant alterations in biochemical and hematological parameters among pediatric scabies patients. Elevated absolute eosinophil count and serum IgE levels were notable findings, indicating a strong hypersensitivity and immune-mediated response to *Sarcoptes scabiei* infestation. Increased eosinophilia in scabies has been attributed to Th2-mediated immune activation and allergic sensitization caused by mite antigens. Similar findings were reported by Walton et al.[18], who observed elevated eosinophil counts and IgE responses in patients with active scabies infestation.

The mean serum IgE level observed in this study was markedly elevated compared to normal pediatric reference values. Elevated IgE levels in scabies are considered a consequence of chronic antigenic stimulation and host immune response. A study by Arlian et al.[19] Demonstrated that scabies mites induce both cellular and humoral immune responses, leading to increased IgE production.

Inflammatory markers such as ESR and CRP were also elevated in the study population, suggesting ongoing systemic inflammation and secondary bacterial infection in some patients. Increased ESR has been reported in severe or prolonged scabies infestations, particularly in children with poor hygienic conditions and overcrowding.[20,21]

Reduced hemoglobin and serum albumin levels observed in this study may reflect underlying malnutrition, chronic inflammation, and recurrent secondary infections commonly associated with pediatric scabies in low socioeconomic settings. Similar associations between anemia, malnutrition, and parasitic skin diseases have been reported in developing countries.[22,23]

Secondary bacterial infection was significantly associated with severe scabies (p=0.002). Persistent scratching leads to skin excoriation, increasing susceptibility to bacterial superinfection, particularly with *Staphylococcus aureus* and *Streptococcus pyogenes*.[17] Such complications may predispose children to cellulitis, post-streptococcal glomerulonephritis, and rheumatic heart disease.

Correlation analysis in the present study demonstrated a significant positive association between disease severity and serum IgE levels, eosinophil count, ESR, and CRP. Serum IgE showed the strongest correlation with scabies severity ($r = 0.61$, $p < 0.001$), suggesting that increasing immunological hypersensitivity may parallel worsening clinical infestation.[18,19]

The positive correlation between eosinophilia and scabies severity supports the role of eosinophils in parasitic immune response. Eosinophils are known to participate in inflammatory tissue reactions induced by mite antigens and may contribute to persistent pruritus and skin inflammation.[20,21]

Elevated ESR and CRP values among severe cases indicate an enhanced inflammatory burden, likely due to excoriation, secondary bacterial infection, and chronic infestation. Previous studies have similarly reported increased inflammatory markers in severe and crusted scabies.[22,24]

A mild negative correlation between hemoglobin levels and disease severity suggests that children with severe scabies may have coexisting nutritional deficiencies or chronic inflammatory states contributing to anemia. Likewise, lower serum albumin levels in severe disease may indicate poor nutritional

status and prolonged systemic inflammatory response.

Overall, the findings suggest that biochemical markers such as serum IgE and eosinophil count may serve as supportive indicators of disease severity in pediatric scabies. These parameters may help clinicians identify children at risk for severe infestation and complications.[23,25]

The present study highlights the importance of integrating clinical and biochemical evaluation in pediatric scabies management. Early recognition and intervention can significantly reduce morbidity and community transmission.

CONCLUSION

Pediatric scabies is highly prevalent among socioeconomically disadvantaged children in Central India. Significant biochemical abnormalities including eosinophilia, elevated serum IgE, anemia, and raised CRP levels were associated with severe disease. Public health measures focusing on hygiene education, early diagnosis, treatment compliance, and prevention of overcrowding are necessary to reduce disease burden and complications.

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