

A Prospective Observational Study on the Prevalence And Associated Risk Factors of Scabies Among Paediatrics

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Abstract

Objective: Scabies is a common dermatological disease in children and is associated with crowding, hygiene practices, socioeconomic status and interpersonal contact. In this study, it was intended to determine the prevalence and the risk factors associated with scabies in pediatric patients presenting to a tertiary care hospital.

Materials and Methods: The study was a prospective observational study, which took place in the dermatology and paediatric departments of a tertiary care teaching hospital in Salem, Tamil Nadu, for six months. The study was conducted on fifty-six children aged 1-12 years, who were randomly selected based on clinically suspected scabies. The data were collected on a proforma containing a routine structure regarding socioeconomic status, demographic characteristics, overcrowding, personal hygiene, clinical features, and treatment. The diagnosis was based on the guidelines of the International Alliance for the Control of Scabies (IACS). The analyses included descriptive statistics, Spearman's rank correlation test, and the Kruskal–Wallis test.

Results: The majority of the participants were aged 6-12 years (48.2%), and 58.9% of them were from rural areas. Moderate overcrowding was found in 42.86%, and moderate personal hygiene in 75% of the houses. The highest occurrence of lesions was in the genital area (21.43%) and interdigital areas (19.64%). The most common symptom was moderate itching (53.57%) and moderate severity of disease (66.07%). All the aforementioned variables: lesion count, overcrowding index, itching intensity, personal hygiene, and school attendance were found to be significantly correlated with severity score ($p < 0.001$). Socio-economic status was significantly related to BMI, overcrowding, hygiene, severity and superinfection ($p < 0.002$).

Conclusions: The prevalence of scabies in children was related to overcrowding, health and personal hygiene, socioeconomic factors, and severity of the disease. Measures aimed at the house, hygiene habits and early treatment could be useful in alleviating the problem of scabies in children.

Keywords: Scabies, children, prevalence, risk factors, overcrowding, personal hygiene, disease severity and socioeconomic status.

Introduction

Scabies is a neglected tropical disease caused by the mite *Sarcoptes scabiei*, which burrows into the skin and causes intense pruritus (1). Although scabies represents a major public health problem in tropical areas, it occurs worldwide, with an estimated 200 million people affected at any given time. Children bear a disproportionate burden of the disease(2). Children are particularly vulnerable because close physical contact, overcrowded living and school environments, and limited hygienic practices facilitate rapid mite transmission(1). In low-income and lower-middle-income countries, children from disadvantaged socioeconomic backgrounds, especially those in urban slums and boarding schools, are the most common victims(3).

The epidemiology of scabies in children varies considerably across geographic and socioeconomic settings. School- and community-based studies report substantial differences in prevalence. Prevalence was approximately 34% among children in Islamic boarding schools (madrasahs) in Bangladesh(3), 22.4% among schoolchildren in urban India(4), 21% among school-age children in Nigeria(5), and 16.1% among elementary schoolchildren in northwest Ethiopia(2). Conversely, studies in Iran and Egypt documented much lower prevalences of 3.1% and 4.4%, respectively (1,6). These variations suggest that the prevalence of scabies is influenced by local socioeconomic, demographic, and environmental conditions.

Several studies have identified household crowding and socioeconomic disadvantage as important factors contributing to scabies transmission. Overcrowded households and classrooms facilitate close and prolonged skin-to-skin contact, thereby increasing the likelihood of transmission.(1). In Egypt, scabies infestation was significantly associated with place of residence, maternal and paternal education status, sleeping arrangements, contact with animals, and sharing of clothes, highlighting the multifactorial nature of scabies transmission (6). Similarly, among Ethiopian schoolchildren, sharing clothes with infected individuals, infrequent washing of clothes, and a history of contact with confirmed cases were strongly associated with scabies(2). Demographic factors also contribute: in Bangladesh, male gender and younger age were significant predictors (3), while in urban India, the child's age,

overcrowding, and type of house were statistically associated with infestation(4).

Despite its considerable burden, scabies in children remains under-recognised, and the importance of its risk factors varies across populations and settings. Local epidemiological data are therefore important for understanding the problem and identifying population-specific-risk factors. Context-specific prevalence data and risk-factor profiles are essential for designing effective control measures. Therefore, the present study was undertaken to determine the prevalence and associated risk factors of scabies among children in the tertiary care hospital with the aim of providing evidence to support targeted preventive interventions.

MATERIAL AND METHODS

It was a prospective observational study, conducted in the dermatology and paediatric outpatient department (OPD) and inpatient department (IPD) of a tertiary care teaching hospital in Salem, Tamil Nadu. The fixed study duration was 6 months and the setting of the study hospital included both uncomplicated and referred cases.

The sample size was determined based on the inclusion and exclusion criteria. An estimated population size (N) of 145 patients was considered, with a margin of error (e) of 0.05. Using Slovin's formula, the calculated sample size was 56. As a result, a total of 56 patients were enrolled using a random sampling method.

Eligibility screening was done to all children aged 1-12 years who reported to the identified departments with suspected cases of scabies. Inclusion criteria were age 1-12 years, clinical appearance suggestive of scabies and written informed consent (consent where appropriate) signed by parents or guardians. The exclusion criteria were the presence of chronic dermatoses, because that may be mistaken for these infections, previous involvement in the study, and immunocompromised condition.

This study was reviewed and approved by the Institutional Ethics Committee of Vinayaka Mission's Kirupananda Variyar Medical College & Hospital the IEC No.is IEC/25/235. Written informed consent was obtained from all participants after explaining the purpose of the study.

Data were collected using a structured, pre-tested proforma. Demographic variables like age, gender, residence, socioeconomic variables (income, type of housing) and family and environmental variables (number of persons per room, water source, sanitation) were collected; hygiene variables, clinical variables (type of symptoms), and treatment variables were collected. An index of crowding was calculated wherever feasible to determine the risk exposures using a simple hygiene score.

The scabies diagnosis was performed by paediatrician according to the International Alliance to Control Scabias (IACS) guidelines whereby cases were considered as confirmed (mites, eggs, or feces identified on microscopic or dermoscopic examination), clinical cases (characteristic lesions and distribution with the appropriate history), and suspected scabies (not otherwise indicated but the presence of compatible symptoms).

All completed proformas were checked for completeness, entered into Microsoft Excel, and the data were subsequently analysed. The frequencies, percentages and mean values were used to summarise prevailing demographic trends, hygiene and environmental trends, and clinical features of scabies.

RESULTS

The frequency distribution of participants by age and sex revealed that the children aged 6–12 were the most numerous (27, 48.20%), the age group of children of 4–5 year was the second most numerous one (16, 28.60%) and the age group of 1–3 year was the third most numerous age group (13, 23.20%). In relation to sex 29 were male(50.88%) and 28 were female (49.12%) showing nearly equal gender distribution. The totals reported, however, are not identical for the two variables-age (n=56) and sex (n=57) and this should be addressed prior to submission(Table 1).

Table 1.

S. No.	Variable	Category	Frequency (n)	Percentage (%)
1	Age Group	1–3 years	13	23.2
		4–5 years	16	28.6
		6–12 years	27	48.2
2	Sex	Male	28	50
		Female	28	50

	Total	Age: 56; Sex: 56	—	—
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When evaluating the intensity of itching, moderate itching was the most common, with 30 (53.57%) participants, while mild and severe itching were next with 13 (23.21%) each. No itching was reported as being too itchy for these participants. Regarding severity score, 50 (89.29%) participants were in moderate severity, 5 (8.93%) participants were in severe and 1 (1.79%) in mild severity. Therefore, in the studied sample population, the symptoms of the disease were moderate, and itching was the major symptom (Table 2).

S. No.	Variable	Category	Score Range	Frequency (n)	Percentage (%)
1	Itching Intensity	Mild	1–3	13	23.21
		Moderate	4–6	30	53.57
		Severe	7–9	13	23.21
		Unbearable	10	0	0
2	Severity Score	Mild	<10	1	1.79
		Moderate	10–49	50	89.29
		Severe	≥50	5	8.93
	Total	Itching Intensity	—	56	100
		Severity Score	—	56	100

The personal hygiene score of the participants revealed that 75.00% (42) of them had moderate score. This was followed by 12 participants (21.43%) showed excellent level of hygiene. 2 Participants (3.57%) had poor personal hygiene. Overall a moderate subscale score for personal hygiene practices was observed in most participants. (Table 3).

Personal Hygiene Score Category	Classification	Frequency (n)	Percentage (%)
0–1	Poor	2	3.57%
2–3	Moderate	42	75.00%
4	Excellent	12	21.43%
Total		56	100.00%

Socioeconomic status

The socioeconomic status distribution, as seen that most number of the respondents are upper lower class (28.57%), followed by lower middle, whose number is 25.00% (n=14). 19.64% (n=11) and 17.86% (n=10) attended from the lower class and upper middle class respectively. The students in the upper classes were 8.93% (n=5), implying that their social-economic status is lower and middle class.

Overcrowding index:

The results indicated a distribution of participants with 24 of them (42.86%) were in moderate risk and 18 of them (32.14%) were in low risk category when based on the overcrowding index. In addition, 14 were deemed high risk (25.00%). Thus the overcrowding of a household was strong in the present sample and the majority of the respondents were moderately overcrowded.

BMI:

The analysis of body mass index (BMI) indicated that the majority of these subjects (45, 80.4%) were of normal weight, while 19.6% (11) were overweight. The overall results showed that the majority of the participants had a normal BMI, suggesting a generally good BMI profile of the study participants.

Water source:

The finding regarding water source showed that nearly two-thirds of the participants (62.50%) reported having access to piped water. Borewell water was used by 23.21% of the participants, while 14.29% obtained water from

community water sources. Overall, piped water was the most commonly used source of water among the study participants.

Superinfection:

The study of the super infection status revealed 35 subjects (62.50%) without superinfections and 21 (37.50%) with superinfections. However, there was a significantly higher number of participants with superinfections, but more lack of superinfection was observed.

Lesion type :

The most common skin lesion, occurring in 41.07% (n=23) of the respondents, was papules; crusts were the next most frequent skin lesion (n=12, 21.43%) and vesicles were most frequent (n=20, 35.71%). Although a few pustules were noted in 1.79% (n=1) of the participants. In total, papules and vesicles were most common skin lesions noted of the subjects as participants in this study.

The Spearman's rank correlation analysis was carried out to evaluate the association between the severity score and the selected demographic, clinical, behavioural and environmental variables. Statistically significant positive correlations were observed between severity score and lesion count ($p = 0.935$, $df = 54$, $p < 0.001$), overcrowding index ($p = 0.619$, $df = 54$, $p < 0.001$), and itching intensity ($p = 0.820$, $df = 54$, $p < 0.001$). The relationships between severity score and personal hygiene score ($p = -0.618$, $df = 54$, $p < 0.001$) and school attendance ($p = -0.554$, $df = 54$, $p < 0.001$) were significant and negatively correlated. The study results showed a positive correlation between lesion burden, overcrowding and severity scores and a negative correlation between hygiene scores and school attendance scores and severity scores. In contrast, the correlations between severity score and age ($p = 0.175$, $df = 54$, $p = 0.196$) and skin lesion type ($p = -0.209$, $df = 54$, $p = 0.122$) were not statistically significant. In general, the more lesions, the more severe the score, and the more itching, the more severe the score, but age and type of skin lesions were not significantly associated with the severity score.

Variables	Spearman's ρ	df	p-value
Age	0.175	54	0.196
Lesion count	0.935	54	<0.001
Personal hygiene score	-0.618	54	<0.001
Overcrowding index	0.619	54	<0.001
Itching intensity	0.82	54	<0.001
Skin lesion type	-0.209	54	0.122
School attendance	-0.554	54	<0.001

Kruskal–Wallis test was used to determine if there were differences in BMI category, overcrowding index, personal hygiene score, severity score, and presence of superinfection among the socioeconomic-status groups. Statistically significant differences were seen for all variables. There was a significant difference between socioeconomic-status groups with regard to BMI category ($\chi^2 = 20.4$, $df = 6$, $p = 0.002$). Similarly, significant differences were observed for overcrowding index ($\chi^2 = 36.2$, $df = 6$, $p < 0.001$), personal hygiene score ($\chi^2 = 26.7$, $df = 6$, $p < 0.001$), severity score ($\chi^2 = 33.1$, $df = 6$, $p < 0.001$), and presence of superinfection ($\chi^2 = 27.5$, $df = 6$, $p < 0.001$). Therefore, the differences in all five variables included were significantly related to socioeconomic status (Table 6).

Table 6. Kruskal–Wallis: Socioeconomic Status vs. Study Variables

Variable	Kruskal–Wallis χ^2	df	p-value	Interpretation
BMI category	20.4	6	0.002	Significant
Overcrowding Index	36.2	6	<0.001	Significant
Personal Hygiene Score	26.7	6	<0.001	Significant
Severity Score	33.1	6	<0.001	Significant

Superinfection Present	27.5	6	<0.001	Significant
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DISCUSSION

In the present study, it has been shown that scabies is an important dermatological issue in pediatrics even in a tertiary care centre. The results showed a significant correlation between clinical severity of scabies, burden of lesions, itching and overcrowding as well as hygiene in the center. The largest proportions in the present study were 6-12 years old children (48.20%) and 4-5 years old children (28.60%) with nearly equal male and female distribution and 1-3 years old children (23.20%). While the majority (99%) of children were of older age, disease severity did not significantly correlate with age ($p = 0.175$, $p = 0.196$), indicating that factors other than age may have stronger influence on the disease severity. A high number of the participants had significant levels of overcrowding with 42.86% being regarded as being at moderate risk, and 25.00% had been identified as being at high risk for overcrowding. There was a strong positive correlation between overcrowding index and severity score ($p = 0.619$, $p < 0.001$), which means that a higher overcrowding index correlated with higher severity score. Close and extended skin-to-skin contact with infected people in overcrowded homes might play a role in the transmission and increase the disease burden. In the current study, the level of personal hygiene was mostly moderate (75.00%) and significant negative correlation was seen with the severity score and personal hygiene score ($p = -0.618$, $p < 0.001$) which suggested that greater an improvement in personal hygiene practice was followed by a decrease in disease severity. From the clinical point of view, moderate itching was the most frequently reported, about 53.57%, of all the patients, after mild itching and severe itching which both amounted to 23.21% each, and severity score mostly moderate with 89.29% of all the patients reporting such score. There was a strong association between itching and severity score ($p = 0.820$, $p < 0.001$) indicating that higher itching, intensity was correlated with disease severity. There was a significant positive correlation between lesion count and severity score ($p = 0.935$, $p < 0.001$) suggesting that incrementing the amount of lesions was closely correlated with increasing the clinical severity. However, severity was not significantly correlated with any of the other variables measured such as skin lesion type ($p = -0.209$, $p = 0.122$). The most common type of lesions were papules (41.07%) and vesicles (35.71%) in the study population. Severity score also exhibited a significant negative correlation with school attendance ($p = -0.554$, $p < 0.001$), which suggests the higher the school attendance, the lower the score of the severity; however, the correlation between attendance and severity score was not causal. Several study variables were significantly different by socioeconomic status (SES). The Kruskal–Wallis test demonstrated a significant difference in BMI category across socioeconomic groups ($\chi^2 = 20.4$, $df = 6$, $p = 0.002$), while significant differences were also observed for overcrowding index ($\chi^2 = 36.2$, $df = 6$, $p < 0.001$), personal hygiene score ($\chi^2 = 26.7$, $df = 6$, $p < 0.001$), severity score ($\chi^2 = 33.1$, $df = 6$, $p < 0.001$), and superinfection ($\chi^2 = 27.5$, $df = 6$, $p < 0.001$). These results clearly show that the SES factors were significantly associated with the environmental, behavioural and clinical factors among the participants. Thirty-seven point 50% of those who took part experienced superinfection, 62.50% did not experience it and the difference in superinfection between the different socioeconomic groups was significant, indicating that socioeconomic status may have an effect on the incidence of secondary complications. The majority of participants had a normal BMI (80.4%) with 19.6% being overweight, and although BMI was not directly related to severity in the reported Spearman analysis, significant differences across the range of socioeconomic group classifications indicate that there is an association between socioeconomic circumstances and nutritional status. In general, the results show that only lesion count, itching score, overcrowding and personal hygiene were highly correlated with the clinical burden of paediatric scabies, with the highest score being for lesion count followed by itching score. Additionally, the socioeconomic results highlight the social context that amplify the connection between characteristics of living conditions, hygiene, overcrowding and clinical outcomes. Early diagnosis, proper treatment, hygiene education and reduction of household overcrowding as far as possible and detection of secondary infections are important. So, Overall, the findings indicate that there should be combined approaches to effective treatment and hygiene promotion, prevention measures for the children, improved living conditions, and school-based interventions.

LIMITATION

The present study undergoes some limitations which should be taken as caution in interpreting the results. Due to the limited timeframe of the study, 6 months, in a single tertiary care teaching hospital, Salem, Tamil Nadu, the results might not be generalizable to other populations and healthcare institutions. The sample size of paediatric

participants was relatively small (56 participants), which could have limited the power of some comparisons. Because of the design of the study, the relationships between socioeconomic status, overcrowding, hygiene and school attendance with the level of disease could not be considered causal. Clinical assessment and structured data collection were the main methods used in the study, so there may have been reporting bias for some behavioural or environmental factors. Besides, the study did not contain long-term follow-up to investigate for the recurrence or treatment outcomes.

CONCLUSION

The present prospective observational study identifies that scabies continues to be a significant dermatological issue among paediatrics and is linked to clinical, behavioural, environmental and socioeconomic scenarios. The results indicated that most participants had moderate severity of the disease; there was moderate positive correlation between the number of lesions and itching level with the severity score. A greater number of children in the household was also highly significant with respect to disease severity and poor personal hygiene was also significantly associated with greater severity of the scabies infection which highlights the importance of household living conditions and hygiene habits in the clinical burden of scabies. The five highest negative correlation scores for school attendance were found for severe, which should not be interpreted to signify a causal relationship. Environmental and clinical parameters, such as BMI and overcrowding, as well as the severity and superinfection of the diseases, were shown to differ significantly by socioeconomic status and thus suggested an important relationship between socioeconomic and environment and clinical parameters of involved children. Thirty-seven and a half per cent (37.50%) of participants had superinfection and this again emphasises that early diagnosis and proper treatment are essential. The study results indicate a need to tackle paediatric scabies beyond the simple treatment of individuals. To incorporate preventive and management strategies with early diagnosis, improved personal hygiene, household overcrowding and identification of secondary infections. Patient counselling by a clinical pharmacist helps improve quality of life by encouraging preventive practices, improving hygiene awareness and reduce disease burden among affected children, highlighting the need to strengthen hygiene practices and improve living conditions, and make these conditions early detected and managed.

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References

1. Sanei-Dehkordi A, Soleimani-Ahmadi M, Zare M, Jaberhashemi SA. Risk factors associated with scabies infestation among primary schoolchildren in a low socio-economic area in southeast of Iran. *BMC Pediatr*. 2021 Dec 1;21(1). doi:10.1186/s12887-021-02721-0 PubMed PMID: 34034686.
2. Tesfaye S, Alem M, Bekele D, Alemu A. The Prevalence and Factors Influencing Scabies among Elementary School Children in Yilmana Densa District, Northwest Ethiopia [Internet]. 2025. Available from: <https://www.researchsquare.com/article/rs-5850656/v1> doi:10.21203/rs.3.rs-5850656/v1
3. Hasan MJ, Rafi MA, Choudhury T, Hossain MG. Prevalence and risk factors of scabies among children living in Madrasahs (Islamic religious boarding schools) of Bangladesh: A cross-sectional study. *BMJ Paediatr Open*. 2024 Jun 28;8(1). doi:10.1136/bmjpo-2023-002421 PubMed PMID: 38942588.
4. Gowtham V, Kalyani P, William Felix AJ. Prevalence of scabies among school children living in urban Chidambaram and its associated risk factors: a cross sectional study. *Int J Community Med Public Health*. 2020 Nov 25;7(12):4879. doi:10.18203/2394-6040.ijcmph20204968
5. Ng O, Nwankwo EN. *Nigerian Journal of Parasitology Handling Editor* [Internet]. Vol. 46. 2025;46(2). doi:10.4314/njpar.v46iXXXX
6. Salah Hegab D, Mahfouz Kato A, Ali Kabbash I, Maged Dabish G. Scabies among primary schoolchildren in Egypt: Sociomedical environmental study in Kafr El-Sheikh administrative area. *Clin Cosmet Investig Dermatol*. 2015;8:105–11. doi:10.2147/CCID.S78287