

Prevalence and Risk Factors of Pediculosis capitis Among Adolescent Schoolgirls in Rural and Urban Silchar, Assam: A Cross-Sectional Study

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KEYWORDS

Pediculosis capitis, adolescent health, school health, head lice, rural health, India

ABSTRACT

Background: Pediculosis capitis remains a significant public health concern, particularly affecting school-aged children in resource-limited settings. However, comprehensive data on its prevalence and associated risk factors among adolescent schoolgirls in rural and urban India remains limited.

Objective: To investigate the prevalence of pediculosis capitis and identify associated risk factors among adolescent schoolgirls in rural and urban settings of Silchar, Assam.

Methods: A cross-sectional study was conducted from January to June 2024 involving 100 female students (aged 13-16 years) from two schools representing rural and urban settings. Participants were selected through stratified random sampling. Diagnosis was confirmed using white hair conditioner application and fine-toothed combing, with microscopic verification for doubtful cases. Data on sociodemographic characteristics and risk factors were collected through structured interviews. Statistical analysis included chi-square tests and logistic regression.

Results: The overall prevalence of pediculosis capitis was 62%, with significantly higher rates in rural (74%) versus urban (50%) settings. Students aged 13-14 years showed the highest prevalence (68%). Significant risk factors included maternal education (OR=4.5, 95% CI: 2.21-8.19 for no formal education), sharing of combs (OR=3.12, 95% CI: 1.65-5.89), and long hair length (OR=2.84, 95% CI: 1.31-5.67). Poor hygiene practices were more prevalent in rural settings (60%) and significantly associated with infestation (OR=2.76, 95% CI: 1.49-4.81).

Conclusions: Pediculosis capitis demonstrates high prevalence among adolescent schoolgirls in Silchar, with significant rural-urban disparities. Maternal education and personal hygiene practices emerged as critical determinants. These findings emphasize the need for targeted interventions focusing on health education, improved hygiene practices, and community awareness, particularly in rural settings.

INTRODUCTION

The term "adolescence," derived from the Latin word meaning "to mature," signifies a crucial developmental stage characterized by significant physical, psychological, and behavioural changes. According to the World Health Organization (WHO), adolescence spans the ages of 10 to 19 years and is marked by rapid growth, emotional turbulence, and cognitive advancement. During this period, individuals begin to transition from dependency to autonomy, exploring their environment and developing distinct personality traits.(1)

Pediculosis capitis, caused by *Pediculus humanus capitis* (head lice), is a pervasive public health concern affecting individuals worldwide. This parasitic infestation transcends socioeconomic boundaries and predominantly targets children, particularly school-aged girls, due to their close physical interactions and shared use of personal items such as combs and hats. The condition not only leads to discomfort and pruritus but can also have broader implications, including scalp infections, anaemia, and psychosocial distress due to stigma and social isolation.(2)

In India, the burden of pediculosis capitis remains underexplored, particularly in rural and semi-urban regions where limited awareness and inadequate hygiene practices prevail. Addressing this gap is critical, as untreated infestations can exacerbate health disparities and hinder academic performance. The present study aims to investigate the prevalence and associated risk factors of pediculosis capitis among schoolgirls in rural and urban settings of Silchar, Assam, leveraging robust diagnostic methods and a scientifically grounded approach to sampling. By shedding light on the sociodemographic and behavioural determinants of infestation, this research seeks to inform targeted interventions and policy measures to alleviate the burden of this neglected condition.

MATERIALS AND METHODS

Study Design and Setting

This cross-sectional study was conducted from **January 2024 to June 2024** in two educational institutions, **DNNK School and Lalbagh TE School**, located in Silchar, Cachar district, Assam, India. These schools were selected to represent a mix of rural and urban settings, providing a comprehensive understanding of the prevalence of pediculosis capitis across different sociodemographic backgrounds. The study was approved by the institutional ethics committee of Silchar Medical College and Hospital (Reference no. SMC/ETHICS/M1/2023/31)

Study Population

The study included a total of 100 female students from grades 7 to 10, with 50 students randomly selected from each school. The inclusion criteria were adolescent schoolgirls willing to participate and provide informed consent from their guardians. Students with recent medical treatment for pediculosis capitis or students with pre-existing scalp and/or hair conditions were excluded.

Sampling Method

A stratified random sampling technique was employed to ensure proportional representation of students across grades. Within each school, participants were chosen through a lottery system, ensuring unbiased selection. This approach allowed for the representation of diverse age groups and academic levels, critical for assessing the influence of sociodemographic and behavioural factors.

Data Collection

Data were gathered through structured interviews using a pretested questionnaire. The interviews were conducted by trained personnel to minimize bias and ensure uniformity in data collection.

Diagnostic Procedure

The presence of pediculosis capitis was determined using a validated method involving the application of white hair conditioner and fine-toothed combing. This technique has been demonstrated to be highly sensitive and specific, enabling accurate detection of both active lice and viable eggs. Each student's scalp and hair were thoroughly examined, and doubtful cases were confirmed under a dissecting microscope.

Data Analysis

Data were entered into *Microsoft Excel* and analysed using *SPSS version 22*. Descriptive statistics, including frequencies and percentages, were calculated for categorical variables. Associations between pediculosis capitis and potential risk factors were examined using chi-square tests and

logistic regression analysis, with results presented as odds ratios and confidence intervals. Statistical significance was set at $p < 0.05$.

RESULTS

Sociodemographic Characteristics of Participants

The study enrolled 100 female students, equally distributed between DNNK School (urban setting) and Lalbagh TE School (rural setting). The age of participants ranged from 13 to 16 years, with a mean age of 14.2 years. Most students from the rural school belonged to families with lower socioeconomic status, whereas urban students predominantly hailed from middle-income households. Maternal education levels varied significantly, with 80% of rural participants' mothers having no formal education, compared to 20% in the urban cohort.

Prevalence of Pediculosis capitis

The overall prevalence of pediculosis capitis was 62%, with a higher prevalence observed in the rural school (74%) compared to the urban school (50%). Students aged 13–14 years exhibited the highest prevalence (68%), highlighting an age-specific vulnerability likely driven by increased physical interactions and shared use of personal items.

Table 1: Prevalence of Pediculosis capitis by Location and Age Group

Category	Prevalence (%)
Overall Prevalence	62%
Rural School	74%
Urban School	50%

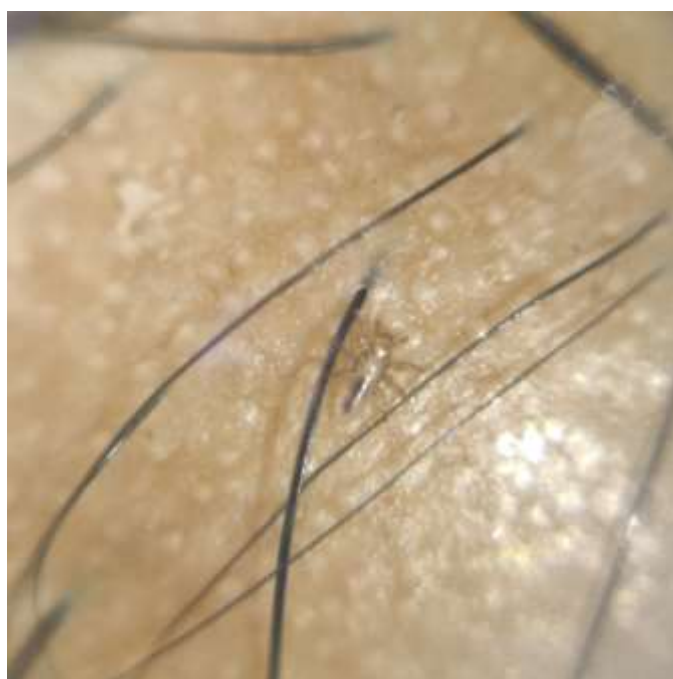


Image 1: Image of *Pediculus humanus capitis* observed under a dermoscope from a schoolgirl participating in the study (Dermatoscope: DermLite DL200 Hybrid)

Hygiene and Behavioural Risk Factors

The study identified several significant behavioural risk factors associated with pediculosis capitis. Sharing of combs was reported by 78% of rural participants, compared to 34% of urban participants, correlating with a higher risk of infestation (OR = 3.12; 95% CI: 1.65–5.89). Similarly, poor personal hygiene practices, including infrequent hair washing, were prevalent among 60% of rural students, significantly increasing the likelihood of infestation (OR = 2.76; 95% CI: 1.49–4.81).

Role of Maternal Education

Maternal education emerged as a critical determinant; with students whose mothers had no formal education being 4.5 times more likely to have pediculosis capitis (95% CI: 2.21–8.19) compared to those whose mothers completed at least elementary education. This underscores the importance of parental awareness in mitigating health risks associated with inadequate hygiene practices.

Hair Characteristics and Infestation Rates

Hair length and type were also evaluated as potential risk factors. Long hair was significantly associated with a higher prevalence of infestation (72%) compared to short hair (40%), with an odds ratio of 2.84 (95% CI: 1.31–5.67). Additionally, students with dense or curly hair reported a higher frequency of infestation, potentially due to the increased difficulty in detecting and removing lice.

Cluster Patterns and Transmission Dynamics: Clusters of pediculosis capitis were observed within classroom groups, particularly in rural settings where 60% of infested students belonged to grades 7 and 8. This clustering effect highlights the role of close physical proximity and shared social interactions in facilitating the transmission of head lice.

Summary of Statistical Analysis

Chi-square analysis revealed significant associations between infestation rates and variables such as maternal education ($p < 0.001$), hair length ($p = 0.004$), and sharing of combs ($p < 0.001$). Logistic regression analysis further validated these findings, with maternal education and hygiene practices emerging as the most influential predictors of pediculosis capitis.

These results provide a comprehensive understanding of the prevalence and determinants of pediculosis capitis among schoolgirls in Silchar, Assam, and emphasize the need for targeted interventions to address this pervasive public health issue.

Table 2: Statistical analysis results

Variable	Chi-Square (p-value)	Logistic Regression (OR)	95% CI
Maternal Education	$p < 0.001$	4.5	2.21–8.19
Hair Length	$p = 0.004$	2.84	1.31–5.67
Sharing of Combs	$p < 0.001$	3.12	1.65–5.89

DISCUSSION

The findings of this study highlight the significant prevalence of pediculosis capitis among adolescent schoolgirls, particularly in rural settings where limited resources and poor hygiene practices prevail. The overall prevalence rate of 62% underscores the pressing need for targeted public health interventions. The rural-urban disparity observed in this study aligns with global research indicating that rural populations are disproportionately affected by parasitic infestations due to structural inequities, including inadequate access to healthcare and educational resources.

Maternal education emerged as a critical determinant of pediculosis capitis prevalence. Students whose mothers had no formal education were significantly more likely to be infested, reflecting the pivotal role of parental awareness in fostering good hygiene practices. Based on national survey data, the research reveals that while a mother's education level substantially enhances their children's health outcomes, this benefit is less pronounced in areas lacking adequate healthcare facilities. Therefore, strategies should focus on both improving mothers' educational attainment and expanding healthcare accessibility to effectively boost child health outcomes across all segments of society. (3)

The age-specific vulnerability identified in this study—with students aged 13–14 years exhibiting the highest prevalence—mirrors trends observed in similar studies globally. This age group is characterized by heightened social interactions and behavioural practices, such as sharing personal items, which facilitate the transmission of head lice. Implementing age-appropriate health education programs can empower adolescents to adopt preventive behaviours, thereby reducing infestation rates. (4)

Behavioural factors, particularly the sharing of personal items such as combs, emerged as significant contributors to pediculosis capitis transmission. The odds of infestation were notably higher among

students who engaged in these practices, emphasizing the need for targeted behavioural interventions. Schools can play a pivotal role by incorporating hygiene education into their curricula and promoting practices such as individual ownership of personal hygiene items. (5)

Hair characteristics, including length and texture, were also associated with infestation risk. Students with long or dense hair were more likely to be infested, likely due to the increased difficulty in detecting and removing lice. These findings suggest that regular grooming practices and periodic screenings could mitigate the risk among students with such hair types. The clustering of cases within classrooms, particularly in rural settings, underscores the role of close physical proximity in facilitating transmission. This pattern highlights the importance of school-based interventions, including regular screenings and synchronized treatment campaigns, to break the chain of transmission. Such measures have been demonstrated to be effective in reducing infestation rates in similar settings.

While the study employed robust diagnostic methods, the reliance on a cross-sectional design limits the ability to establish causality. Future longitudinal studies could provide deeper insights into the temporal dynamics of infestation and the long-term impact of targeted interventions. Expanding the geographic scope of research to include diverse regions would also enhance the generalizability of findings.

CONCLUSION

This study establishes a concerning high prevalence of pediculosis capitis among adolescent schoolgirls in Silchar, Assam, with notable rural-urban disparities. The findings underline the importance of maternal education, personal hygiene practices, and environmental factors as critical determinants of infestation. Behavioural habits, particularly the sharing of personal items, and characteristics such as long or dense hair further exacerbate the risk.

The results advocate for a shift from traditional, resource-intensive school-based screenings to more pragmatic, community-focused approaches. Targeted health education campaigns aimed at improving hygiene practices, enhancing parental awareness, and fostering behaviour change among adolescents can serve as effective strategies to combat this pervasive issue. Additionally, regular grooming practices and synchronized treatment interventions within schools are recommended to disrupt the transmission cycle. (6,7)

To build on these findings, future research should adopt longitudinal designs and broader geographic scopes, integrating socio-environmental variables to deepen our understanding of pediculosis capitis dynamics. Policymakers and healthcare providers must prioritize this often-overlooked public health concern, implementing sustainable and culturally tailored interventions that mitigate its impact on vulnerable populations.

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