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Research Article

Prevalence, Disease Burden and Factors Associated with Head Lice Infestation among Primary School Girls in Galle Educational Division, Southern Sri Lanka

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Abstract

Background: Head lice infestation (HLI) remains a common public health problem among school-aged children worldwide, particularly among girls in developing countries. Despite its considerable physical, psychological, educational, and economic burden, evidence regarding HLI among Sri Lankan school children is limited. This study aimed to assess the prevalence, disease burden, and factors associated with HLI among primary school girls in the Galle Educational Division, Southern Sri Lanka.

Methods: A school-based, descriptive cross-sectional study was conducted among grade four and five girls attending government primary schools in the Galle Educational Division, Sri Lanka. A multistage cluster random sampling technique was used to recruit participants. Data were collected using pre-tested self-administered questionnaires completed by parents. Direct scalp examinations were performed by the investigator to confirm head lice infestation. Descriptive statistics were used to summarize the data, while Chi-square tests and binary logistic regression analyses were performed to identify factors associated with HLI.

Results: A total of 380 participants were included in the study, yielding a response rate of 90.5%. The prevalence of HLI was 58.2% (n = 221). Among the identified cases, 209 were reported by parents, while an additional 12 cases were detected through scalp examination. Manual removal was the most commonly used treatment method (31.1%). Parents reported significant impacts of HLI on children's personality (65.1%), education (64.6%), academic activities (52.6%), and sleep (50.7%). Multivariable logistic regression identified larger family size (Odds Ratio; OR = 2.216) and sharing personal combs (OR = 2.737) as significant risk factors for HLI, while older age (OR = 0.506) and higher monthly family income (OR = 0.480) were identified as protective factors.

Conclusions: HLI is highly prevalent among primary school girls in the Galle Educational Division and imposes substantial psychosocial, educational, and economic burdens on affected children and families. Strengthening school-based screening programs, parental health education, early detection strategies, and community-level interventions is essential for effective prevention and control of HLI among school children in Sri Lanka.

Keywords: *Disease Burden, Head Lice Infestation, Risk Factors, School Children, Sri Lanka*

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Introduction

Head lice infestation (HLI), also known as *Pediculosis capitis*, is one of the oldest known parasitic infestations affecting humans and continues to remain a significant public health concern worldwide in both developed and developing countries (Albashtawy, 2014; Falagas et al., 2008). It is caused by *Pediculus humanus var. capitis*, an obligate ectoparasite that inhabits the human scalp and survives by feeding on blood (Souza et al., 2022). The parasite possesses six specialized legs adapted for grasping hair shafts and moving efficiently through scalp hair. Female lice typically lay 5–10 eggs per day near the scalp where temperature and humidity are optimal for survival, and the attachment of eggs to hair shafts may damage the hair structure (Bailey & Prociv, 2000). Adult female lice have an average lifespan of approximately 30 days. In warm and humid climates, viable nits are commonly found within 15 mm of the scalp, particularly around the nape of the neck (Bailey & Prociv, 2000). The diagnosis of HLI is primarily clinical and is confirmed through visualization of live lice or nymphs on the scalp or hair (Falagas et al., 2008).

HLI predominantly affects school-aged children, particularly those attending preschool and primary school, who are highly dependent on parental care and supervision (Burgess, 1998). Transmission mainly occurs through direct head-to-head contact, although indirect spread may occur through sharing personal items such as combs, towels, hats, and hair accessories. The infestation can spread during various stages of the lice life cycle including eggs, nymphs, and adult lice, while certain grooming practices and air movements during hair drying may further facilitate transmission (Hill & Carolina, 2007; Souza et al., 2022).

The prevalence of HLI varies considerably across countries and regions and is influenced by multiple socio-demographic and behavioral factors. Gender, age, socioeconomic status, population density, and hygiene practices have been identified as important determinants of infestation (Buczek et al., 2004; Rukke et al., 2011). In addition, inadequate compliance with pediculicide treatment, misdiagnosis, and poor adherence to treatment regimens contribute to persistent infestation and re-infestation (Burgess, 1998). Children aged between three and 12 years are considered the most vulnerable group for infestation, and elementary schools are often recognized as settings with epidemic potential for HLI transmission (Bailey & Prociv, 2000; Daneshvar et al., 2021).

Studies conducted in several South Asian countries have demonstrated a high prevalence of HLI among female school children. Prevalence rates of 50.1% in Thailand, 59.67% in Bangladesh, and 71.1% in India have been reported (Karim et al., 2015; Saraswat et al., 2020; Singhasivanon et al., 2019). Similarly, studies conducted in Iran have reported prevalence rates ranging from 0.42% to 6.73% among school girls (Firoozfar et al., 2019; Salehi et al., 2014). Girls are consistently reported to have a higher risk of infestation than boys, mainly due to longer and finer hair, increased hair-to-hair contact, and grooming practices (Banafshi & Khatony, 2024).

In Sri Lanka, evidence regarding HLI remains limited despite the tropical climate and social conditions that may favor transmission. A study conducted among school children aged 5–16 years reported pediculosis as the most prevalent ectoparasitic infestation (42%) compared with other skin conditions such as scabies, dandruff, and fungal infections (Gunathilaka et al., 2019). The warm and humid climate of Sri Lanka may provide favorable conditions for lice survival and transmission (Sangaré et al., 2016). Furthermore, socio-cultural practices such as maintaining long hair, sharing grooming items, and close contact among school children may further increase susceptibility to infestation.

Although HLI is not considered a life-threatening condition, its consequences extend beyond a simple parasitic infestation. Physically, affected children commonly experience intense scalp itching, excoriations, sleep disturbances, and secondary bacterial infections, while prolonged infestations may lead to cervical lymphadenopathy (Padzik et al., 2023). Beyond the physical burden, HLI is associated with considerable psychological and social consequences. Due to misconceptions linking lice infestation with poor personal hygiene, affected children often experience shame, embarrassment, stigma, social isolation, bullying, and reduced self-esteem (Banafshi & Khatony, 2024). A recent Australian study further highlighted the emotional distress experienced by school children with HLI and emphasized the additional burden placed on teachers and school systems (Barrow et al., 2026).

The educational and economic impacts of HLI are also substantial. Persistent itching and discomfort may impair concentration and academic performance, while school absenteeism or exclusion policies may further disrupt education. Repeated infestations also create a financial burden for families due to treatment expenses and the time required for hair care and nit removal. High rates of reinfestation within households further complicate control efforts and contribute to the persistence of HLI as a community health issue (Neuberg et al., 2022; Nezhadali, 2020)

Despite the significant burden associated with HLI, locally relevant evidence regarding its prevalence, associated factors, and disease burden among Sri Lankan school girls remains scarce. Understanding the epidemiology and consequences of HLI within the local context is essential for developing effective school health programs, public health interventions, and nursing strategies aimed at prevention and control. Therefore, this study was conducted to assess the prevalence, disease burden, and factors associated with HDI among primary school girls in the Galle Educational Division of Southern Sri Lanka.

Methods

Study design, setting, and participants

This school-based, descriptive cross-sectional study was conducted among government primary schools, including girls' schools and mixed schools, in the Galle Educational Division, Sri Lanka. Data were collected from girls studying in grades four and five in ten selected primary schools.

A multistage cluster random sampling technique with two-stage cluster sampling was used to recruit participants. In the first stage, schools were selected as clusters through random sampling. In the second stage, grade four and grade five classes within the selected schools were randomly selected as sub-clusters. Subsequently, eligible female students were selected from each class using a systematic random sampling method based on the class register.

For systematic random sampling, the sampling interval (k) was calculated by dividing the total number of eligible girls in each class by the required sample size for that class. The first participant was selected using the lottery method, and thereafter every kth student on the register was recruited into the study.

According to educational statistics, the Galle Educational Division comprises 19 provincial council schools and 09 national schools. Since the study focused only on girls, girls' schools and mixed schools were screened according to the inclusion and exclusion criteria. Girls whose parents were fluent in Sinhala or English, children without diagnosed psychological conditions, and those whose parents expressed willingness to participate were included in the study. Girls who had medically diagnosed ectoparasitic infections other than head lice infestation, children whose parents were illiterate, and those whose parents were physically or mentally unstable were excluded in order to minimize potential confounding factors.

Among the eligible schools, schools were randomly selected for the study. Data were collected from 380 students over a one-month period. The sample size was calculated using the formula described by Lwanga and Lemeshow (1991). A total sample size of 420 was determined using a reported prevalence of 42% for head lice infestation in Sri Lanka (Gunathilaka et al., 2019), with a 95% confidence level and an anticipated non-response rate of 12%.

Data collection and tools

Data collection comprised of a self-developed questionnaire for parents of school girls, and direct inspection of heads of school girls.

Questionnaire for parents

The questionnaire administered to parents was a pre-tested, self-administered questionnaire consisting of several sections.

Section 1 collected information on demographic and socioeconomic characteristics, including age, nationality, religion, type of school, parental educational level, parental occupation, number of family members, number of siblings, number of bedrooms in the household, sleeping arrangements of the child, bathing facilities, and monthly family income.

Section 2 focused on hygienic practices/treatment seeking related to HLI. This section included questions regarding bathing frequency per week, hair cleansing agents used, frequency of cleaning personal combs, sharing of combs with family members, sharing of personal items such as bed linen, pillows, and clothing and hair length (assessed using visual aids).

Section 3 asked the parents to mark whether the child HLI. In addition, information regarding the duration of head lice infestation, treatments used, medical consultations sought for treatment, and home remedies practiced for HLI was also collected in this section.

Section 4 assessed parental perspectives on the burden of HLI. This section was designated for only the parents who marked that their child is infested with the head lice. The frequency of scalp scratching, and severity of scalp scratching assessed using a numbered visual analogue scale (Figure 1). Parents were instructed to use the child's scalp scratching behavior over the previous 24 hours when rating its severity.

Then, parents' perceptions of the impact of HLI on the child's education, sleeping patterns, social interactions and economic burden were rated with a 'yes', 'no' and 'do not know' scale.

Direct inspection of heads

A head examination was conducted for each selected school girls by the principal investigator to identify the presence of visible live head lice and/or live nymphs. The principal investigator was trained by a dermatologist for the visual inspection. The scalp and hair were inspected for approximately 20 seconds for each student. The diagnosis of HLI was confirmed by the identification of live lice, live nymphs, or viable nits/eggs during the examination. Particular attention was given to the frontal, temporal (behind the ears), and occipital regions of the scalp, as these are common sites for infestation (Bamaga et al., 2021). Personal protective equipment, including gloves and masks, was used separately for each student to minimize the risk of cross-infestation during the examination procedure.

Pre-test

The questionnaire was pre-tested prior to commencement of the main study. The pre-test was conducted with ten parents in the Unawatuna area, which was not included in the main study setting. The pre-testing process primarily evaluated the clarity, comprehensiveness, relevance, and completion time of the questionnaires. Based on the feedback received, modifications were made to improve the final versions of the instruments.

Statistical analysis

Descriptive statistics were used to describe the sociodemographic characteristics, hygienic practices, prevalence of HLI, and the impact of HLI on education, social interactions, and sleep. Data were presented as frequencies and percentages.

The associations between HLI and sociodemographic characteristics and hygienic practices were initially analyzed using the Chi-square test comparing between those with HLI and not with HLI. Variables that demonstrated statistical significance at $p < 0.05$ in the Chi-square analysis were subsequently included in the binary logistic regression analysis.

Univariate logistic regression analysis was performed with unadjusted (crude) OR at

95% CI to confirm the factors that were associated with HLI in the Chi-square test. Multiple logistic regression (backward-conditional) was applied for the variables that were significant in the Univariate analysis for retaining only the most significant associated risk factors for HLI and presented with adjusted OR and 95% CI.

Statistical analyses were performed using Statistical Package of Social Sciences (SPSS) version 26.0. P value < 0.05 was regarded as acceptable.

Ethical considerations

Ethical clearance for this study was obtained from the Ethics Review Committee, Faculty of Allied Health Sciences, University of Ruhuna, Sri Lanka (Reference no - 164.11.2022). permission for the study was taken from the Director of Education, Southern province and from the principals of selected schools. The data collection was conducted by sending questionnaires to the parents. In the scalp inspection, minimal disruption to the routine schedules were maintained as well as the scalp inspection was done at a selected room in the school without breaching the girls' privacy and confidentiality. All methods were carried out in accordance with relevant ethical guidelines and regulations.

Results

The response rate of the study was 90.5%, with 380 completed responses obtained from the total calculated sample size of 420 participants.

Sociodemographic and characteristics of the sample

Sociodemographic characteristics of the school girls participated in the study are shown in Table 1. The majority of the participants belonged to the Sinhala Buddhist ethnic group, accounting for 88.9% (n = 338) of the sample. Most of the participants were ten years of age. Regarding parental education, the majority of mothers (77.6%, n = 295) and fathers (86.8%, n = 330) had received education up to the secondary school level.

With regard to parental occupation, most fathers were employed (98.2%, n = 373), whereas the majority of mothers were unemployed (68.9%, n = 262). In addition, information regarding the number of family members, number of children in the family, number of bedrooms in the household, sleeping arrangements of the child, availability of bathing facilities, and monthly family income was also collected and analyzed as shown in the Table 1.

Prevalence of HLI

Out of the total sample of 380 primary school girls, 221 were identified as having HLI, resulting in a prevalence of 58.2% among primary school girls in the Galle Educational Division.

Sociodemographic characteristics comparison between those with HLI and not with HLI are shown in Table 1.

The prevalence of HLI was assessed using two approaches. First, parents were asked whether their child had head lice infestation.

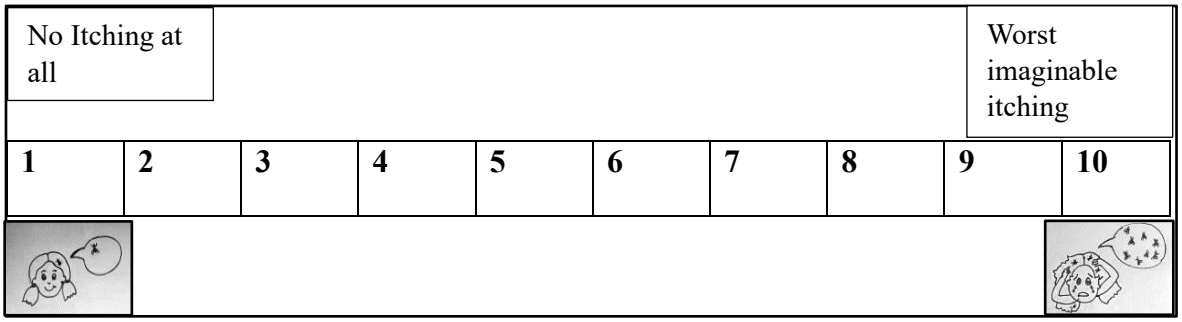

Figure 1. Number- scaled visual analogue scale

Table 1: Socio-demographic profile of the participants (n=380)

Variables	Categories	Presence of head lice		Total (%)
		Yes (n=221) Frequency (%)	No (n = 159) Frequency (%)	n=380 Frequency (%)
Age (years)	Nine	79 (35.7)	37 (23.3)	116 (30.5)
	Ten	142 (64.3)	122 (76.7)	264 (69.5)
Nationality	Sinhala	196 (88.7)	142 (89.3)	338 (88.9)
	Muslim	25 (11.3)	17 (10.7)	42 (11.1)
Type of School	Girls'	117 (52.9)	81 (50.9)	198 (52.1)
	Mixed	104 (47.1)	78 (49.1)	182 (47.9)
Mother's education level	Primary level	16 (7.3)	7(4.4)	23 (6.1)
	Secondary level	177 (80.1)	118(74.2)	295 (77.6)
	Tertiary level	28 (12.7)	34 (21.4)	62 (16.3)
Mother's occupation	Employed	63 (28.5)	55 (34.6)	118 (31.1)
	Unemployed	158 (71.5)	104 (65.4)	262 (68.9)
Father's education	Primary level	9 (4.1)	4 (2.5)	13 (3.4)
	Secondary level	195 (88.2)	135(84.9)	330 (86.8)
	Tertiary level	17 (7.7)	20 (12.6)	37 (9.7)
Father's occupation	Employed	219 (99.1)	154 (96.9)	373 (98.1)
	Unemployed	2 (0.9)	5 (3.1)	07 (1.9)
Number of family members	= < 4 members	84 (38.0)	94 (59.1)	178 (46.8)
	> 4 members	137 (62.0)	65 (40.9)	202 (53.2)
Number of children in the family	1-3	207 (93.7)	153 (96.2)	360 (94.7)
	4-7	13 (5.9)	5 (3.1)	18 (4.7)
Number of bedrooms	1-3	186 (84.2)	132 (83.0)	318 (83.7)
	4-7	33 (14.9)	27 (17.0)	60 (15.8)

Table 1: Socio-demographic profile of the participants (n=380) *(Cont.)*

The child sleep with	Sleep alone	20 (9.0)	23 (14.5)	43(11.3)
	Sleep with someone else	201 (91.0)	136 (85.5)	337 (88.7)
Bathroom facility at home	Available	178 (80.5)	137(86.2)	315 (82.9)
	Not available	43 (19.5)	22 (13.8)	65 (17.1)
Monthly income (LKR)	<50 000	147 (66.5)	79 (49.7)	226 (59.5)
	=>50 000	74 (33.5)	80 (50.3)	154 (40.5)

Table 2: The prevalence of HLI – Comparison between parental response and direct inspection (n=380)

		Head lice inspection	
Parental response		Yes Frequency (%)	No Frequency (%)
	Yes Frequency (%)	209 (55%)	-
	No Frequency (%)	12(3.2%)	159(41.8%)
	Total	221	159

Table 3: Hygienic practices followed by the schoolgirls (n=380)

Variable	**Subgroups**	**Presence of head lice**		**Total (%)**
		Yes (n=221) Frequency (%)	**No (n = 159) Frequency (%)**	**(n=380) Frequency (%)**
Frequency of bathing per week	Less three days	61(57.5)	45 (42.5)	106 (27.9)
	Three days	92 (58.2)	66 (41.8)	158 (41.6)
	More than three days	68 (58.6)	48 (41.4)	116 (30.5)
Cleansing agent on hair	Soap	94 (61.4)	59 (38.6)	153 (40.3)
	Shampoo	125 (56.3)	97 (43.7)	222 (58.4)
	Other	2 (40.0)	3 (60.0)	5 (1.3)
Frequency of cleaning comb per week	Neither once a week	73 (52.9)	65 (47.1)	138 (36.3)
	Once a week	116 (61.7)	72 (38.3)	188 (49.5)
	More than once a week	32 (59.3)	22 (40.7)	54 (14.2)

Table 3: Hygienic practices followed by the schoolgirls (n=380) (Cont.)

Share personnel comb with others	Yes	149 (69.3)	66 (30.7)	215 (56.6)
	No	72 (43.6)	93 (56.4)	165 (43.4)
Share personnel items with others (towel, pillows, linens)	Yes	74 (67.3)	36 (32.7)	110 (28.9)
	No	147 (54.4)	123 (45.6)	270 (71.1)
Length of hair	Short hair	53 (55.2)	43 (44.8)	96 (25.3)
	Medium hair	107 (56.9)	81(43.1)	188 (49.5)
	Long hair	61(63.5)	35 (36.5)	95(25)
Frequency of scalp scratching	Rarely	26 (19.1)	110 (80.9)	136 (35.8)
	Frequently	149 (75.3)	49 (24.7)	198 (52.1)
	Always	46 (100)	0	46 (12.1)

Subsequently, all selected students underwent scalp examination by the investigator to confirm the presence of head lice infestation. Among the 221 identified cases of HLI, cases were reported by parents, while an additional 12 cases were detected during the scalp examination despite not being previously reported by parents, as shown in Table 2.

Hygienic practices followed by schoolgirls

In the study sample, 41.57% (n = 158) of participants reported bathing three times per week.

The majority of participants, 58.4% (n = 222), used shampoo for hair cleansing.

Regarding comb hygiene practices, 49.5% (n = 118) cleaned their personal comb at least once per week. With respect to sharing of personal items within the household, 56.6% (n = 215) reported sharing their personal comb with other family members, while 28.9% (n = 110) reported sharing other personal items such as towels, bed linens, and pillows with family members (Table 3).

Treatment seeking practices among the girls with HLI

Among the infested group (n = 209), the majority of participants (34.4%, n = 72) reported a duration of infestation of less than six months. The lowest proportion (15.4%, n = 32) reported a duration of infestation between 13 and 24 months. Although only 20.4% (n = 43) of the infested girls had sought medical consultation for head lice infestation, 59.7% (n = 125) reported using various treatment methods for management of HLI.

Among students who were not currently infested, 25% (n = 52) reported a history of HLI within the previous three months.

With regard to treatment practices, manual removal was the most commonly preferred method (31.1%), while a very small proportion (0.4%) reported the use of kerosene oil for head lice removal (Figure 2).

Disease burden of HLI as perceived by parents

Based on the scalp scratching severity assessed using a numerical visual analogue scale (Figure 1), 16.7% of students reported a score corresponding to the 5th rank, which represented the highest proportion among the scale categories. The lowest proportion, 8.1%, was observed among students reporting the most severe level of itching (10th rank).

Parental responses indicated considerable concern regarding the impact of HLI on multiple aspects of the child's well-being as shown in Table 4. The majority of parents reported that HLI affected their child's personality (65.1%, n = 136) and education (64.6%, n = 135). More than half of the respondents indicated that HLI interfered with academic work (52.6%, n = 110) and sleep patterns (50.7%, n = 106).

The financial implications of HLI were also evident, with a proportion of families (6.7%, n = 14) reporting that they allocated additional resources for treatment. However, 40.8% (n = 60) of parents indicated that the financial burden was manageable.

Participation in health education sessions related to HLI was considerably low among parents of infected girls (Table 4).

Association between sociodemographic factors and hygienic practices with HLI

Chi square test analysis revealed that age, mother's education, number of family members, monthly income, sharing of combs, and sharing of other personal items (such as pillows, bed linens, and towels) were significantly associated with HLI ($p<0.05$) (Table 5).

Univariate logistic regression revealed the same factors significant ($p<0.05$) as those

observed in the Chi-square test except mother's education level ($p>0.05$).

Further analysis using multivariable logistic regression identified age (adjusted OR = 0.506), number of family members (adjusted OR = 2.216), monthly family income (adjusted OR = 0.480), and sharing of personal combs with others (adjusted OR = 2.737) as significant predictors of HLI.

Among these factors, having a larger number of family members and sharing personal combs with others emerged as significant risk factors for HLI. In contrast, being ten years of age compared to nine years of age and having a higher monthly family income compared to lower income levels were identified as protective factors against HLI (Table 6).

Discussion

This study aimed to assess the prevalence, disease burden and further the factors associated with HLI among primary school girls in Galle Educational Division, Sri Lanka. This study identified significant rate of HLI prevalence associated with socioeconomic and hygienic factors associated factors while underscoring the evidence for disease the burden which drives initiation of another significant aspect in school health.

Prevalence of HLI

The present study revealed a high prevalence of HLI among primary school girls in the Galle Educational Division, with more than

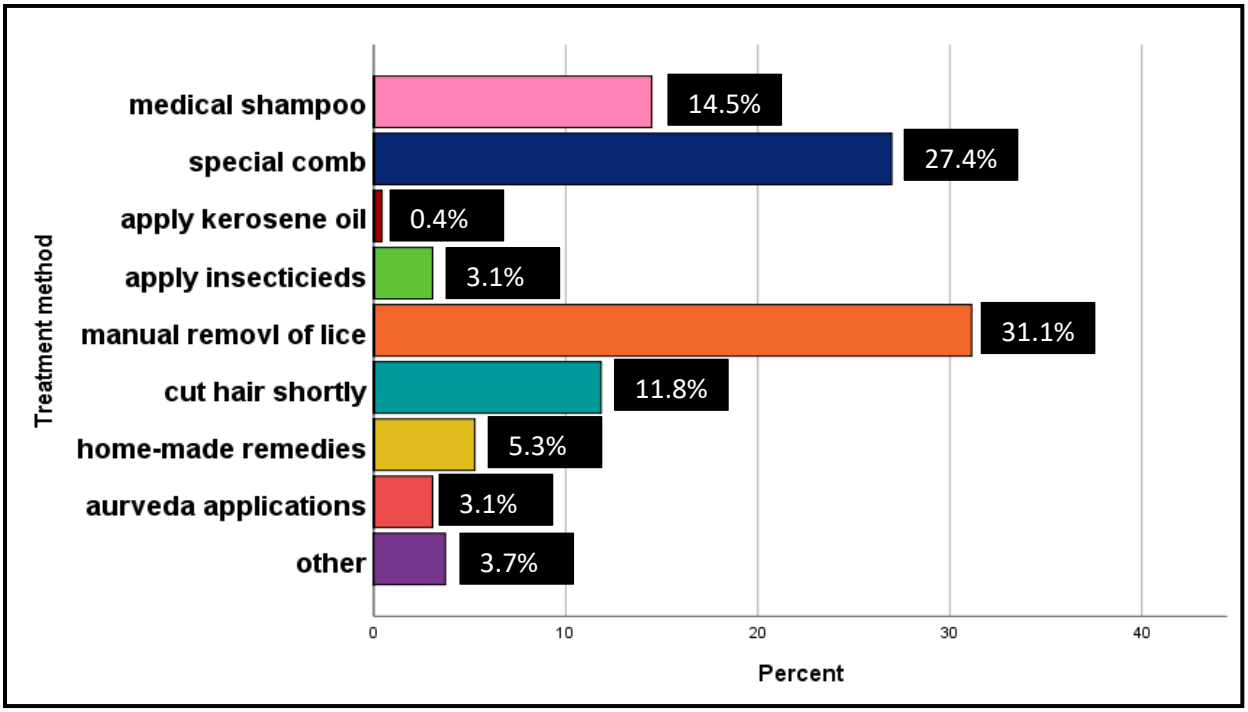

Figure 2: Methods used in removing head lice (n=209)

Table 4: Disease burden of HLI as perceived by parents (n=209)

Information	Frequency (%)		
	Yes	**No**	**Don't know**
Education & sleep			
Do you think head lice affect for your child's education?	135 (64.6)	55 (26.3)	19 (9.1)
Does presence of Head Lice cause discomforts to your child when she engages in studies at home?	110 (52.6)	88 (42.1)	11 (5.3)
Did she miss school because of Head Lice Infestation?	2 (0.8)	207 (99.2)	-
Does your child complain of discomforts in sleeping at night because of Head Lice Infestation?	106 (50.7)	103 (49.3)	-
Does your child wake up at mid- night while sleeping due to scratching of the scalp?	92 (44.0)	99 (47.4)	18 (8.6)

Table 4: Disease burden of HLI as perceived by parents (n=209) *(Cont.)*

Personality and Social Stigma			
Do you think head lice affect your child's personality?	136 (65.1)	43 (20.6)	30 (14.4)
Did your child complained about any personality related issues (peer rejection)?	20 (9.6)	175 (83.7)	14 (6.7)
Does your child discourage to visit her neighbors, relatives and friends due to presence of Head Lice?	43 (20.6)	148 (70.8)	18 (8.6)
Were you told by the child that she was bullied by peers/teachers at the school due to Head Lice?	51 (24.4)	158 (75.6)	
Were you told by your child that she was discriminated against in school due to Head Lice?	53 (25.4)	156 (74.6)	
Economic burden			
Do you spend money for treatment/consult a doctor/to buy commercially available products?		Frequency (%)	
None		62 (29.7)	
Only medications		31 (14.8)	
Only to doctor consultation		2 (1.0)	
Only to buy commercial products		62 (29.7)	
Both medications and doctor consultation		13 (6.2)	
Both medications and commercial products		23 (11.0)	
Both doctor consultation and commercial products		2 (1.0)	
For all purposes		14 (6.7)	
How you feel on spending money on spending money?			
No issue at all		35 (23.8)	
Manageable		60 (40.8)	
Little challenging		29 (19.7)	
Challenging		19 (12.9)	
Extremely challenging		4 (2.7)	

Table 5: Chi-square analysis of factors associated with HLI (n = 380)

Variables		Presence of HLI		p value
		Yes Frequency (%)	No Frequency (%)	
Socio-demographic profile				
Age (years)	Nine	79(35.7)	37(23.3)	0.009
	Ten	142(64.3)	122(76.7)	
Mother's education level	Primary level	16 (7.3)	7(4.4)	0.041
	Secondary level	177 (80.1)	118(74.2)	
	Tertiary level	28 (12.7)	34 (21.4)	
Number of family members	= < 4 members	84(38.0)	94(59.1)	<0.001
	> 4 members	137(62.0)	65(40.9)	
Monthly income (LKR)	<50 000	147(66.5)	79(49.7)	0.001
	=>50 000	74(33.5)	80(50.3)	
Hygienic practices				
Share personnel comb with others	Yes	149 (69.3)	66 (30.7)	<0.001
	No	72 (43.6)	93 (56.4)	
Share personnel items with others (towel, pillows, linens)	Yes	74 (67.3)	36 (32.7)	0.025
	No	147 (54.4)	123 (45.6)	

HLI Head Lice Infestation; LKR Sri Lankan Rupee

Table 6 – Multivariate logistic regression analysis (n = 380)

Variables		Adjusted OR	95% CI of adjusted OR	p value
Socio-demographic profile				
Age	Nine*	0.506	0.310 – 0.828	0.007
	Ten			
Number of family members	= < 4 members*	2.216	1.423 – 3.450	<0.001
	> 4 members			
Monthly income	<50 000*	0.480	0.307 – 0.751	0.001
	=>50 000			
Hygienic practices				
Share personnel comb with others	Yes	2.737	1.689 – 4.436	<0.001
	No *			
Share personnel items with others (towel, pillows, linens)	Yes	1.042	0.608 – 1.784	0.881
	No *			

**Reference variable; OR Odds Ratio*

half of the participants (58.2%) being affected. The finding highlights HLI as a significant public health concern among school-aged girls in Southern Sri Lanka and emphasizes the urgent need for effective preventive and control strategies within school and community settings.

The high prevalence observed in the present study is consistent with findings from previous local and international studies. A study conducted in Western Sri Lanka reported pediculosis as the most prevalent ectoparasitic infestation among school children, with a prevalence of 42% (Gunathilaka et al., 2019). Similar prevalence rates among female school children have also been reported in Thailand (50.1%) and Assiut City, Egypt (52.1%) (El-Maghrabi et al., 2015; Singhasivanon et al., 2019). Furthermore, the prevalence identified in the current study closely resembles findings from Yemen (58.5%) (Bamaga et al., 2021) and Bangladesh (59.67%) (Karim et al., 2015).

An even higher prevalence of 79% among school girls has been reported in Argentina (Catalá et al., 2005), suggesting that HLI continues to be highly prevalent in certain communities despite geographical and socioeconomic differences. In contrast, substantially lower prevalence rates have been documented in Iran, ranging from 0.42% to 4.33% (Doroodgar et al., 2014). Such variations in prevalence across countries and regions may be influenced by multiple factors including climatic conditions, socioeconomic status, personal hygiene practices, overcrowding, access to healthcare services, public awareness, and differences in school health policies and treatment practices.

The warm and humid climatic conditions in Southern Sri Lanka may provide a favorable environment for the survival and transmission of head lice. In addition, socio-cultural practices such as maintaining long hair among girls, close interpersonal contact in school environments, and sharing of personal grooming items may further contribute to the high prevalence observed in this population.

Disease burden of HLI

The present study explored the disease burden of HLI by examining head lice removal practices and the impact of HLI on children's personality, social interactions, education, sleep, and family economic status based on parental and teachers' perspectives.

With regard to head lice removal practices, manual removal was identified as the most commonly used method (31.1%), while only a small proportion of participants reported using insecticides (3.1%) and kerosene oil (0.4%). Similar findings have been reported in studies conducted in Australia and Brazil, where only a minority of families used insecticides and inflammable substances for treatment (Counahan et al., 2007; Silva et al., 2008). In contrast, a study conducted in Jordan reported a substantially higher use of kerosene oil (61%) for head lice treatment (Albashtawy, 2014). The low use of harmful substances in the present study may reflect increasing awareness regarding safer treatment practices among Sri Lankan families.

The findings of this study further demonstrated a considerable psychological and social burden associated with HLI. The majority of parents (65.1%, n = 136) believed that head lice infestation negatively affected their child's personality. Furthermore, 24.4% (n = 51) and 25.4% (n = 53) of girls reported experiences of bullying and discrimination at school due to HLI, respectively. These findings are supported by previous literature indicating that children with pediculosis frequently experience shame, embarrassment, rejection, and emotional distress during infestation outbreaks (Barrow et al., 2026; Purdy et al., 2012). Similarly, a survey conducted in Brazil reported that 92% of parents considered head lice infestation to be embarrassing and believed that affected children were viewed negatively by peers, teachers, and even family members (Silva et al., 2008). Such social stigma may further contribute to reduced self-esteem and emotional well-being among affected children.

The educational impact of HLI was also notable in the present study. More than half of the parents (64.6%, n = 135) expressed concern that HLI negatively affected their child's education, while 52.6% (n = 110) reported discomfort when engaging in studies at home. Although school absenteeism due to HLI was minimal in the present study, with 99.2% (n = 207) continuing school attendance despite infestation, findings from an Australian study demonstrated a positive association between HLI and school absenteeism (Counahan et al., 2007). In addition, teachers in the present study observed that 75.7% (n = 115) of infested girls had difficulties concentrating on academic activities. Persistent scalp itching, discomfort, and psychological distress associated with HLI may therefore negatively influence concentration and academic performance even in the absence of school absenteeism.

Sleep disturbances associated with HLI were also evident among affected children. Approximately half of the participants (50.7%, n = 106) reported discomfort during sleep, while 44% (n = 92) reported waking up during the night due to scalp scratching. Similar findings were observed in a Brazilian study, where 65% of parents reported disturbed sleep among affected children, mainly due to irritability caused by itching (Silva et al., 2008). Sleep disruption may further aggravate daytime fatigue, irritability, and poor concentration among school children.

The economic burden associated with HLI was relatively moderate in the present study. The highest proportion of families (29.7%, n = 62) reported spending money mainly on commercially available products for treatment. Only 6.7% (n = 14) reported spending money on all aspects of management, including doctor consultations, treatments, and commercial products. Most parents (40.8%, n = 60) considered the financial burden manageable, while only a small proportion (2.7%, n = 4) described it as extremely challenging. In contrast, studies conducted in Iran and the United States have reported considerably higher economic burdens related to diagnosis, medical consultations, prescribed treatments, and hair care products associated with HLI management (Hansen & O'Haver, 2004;

Salimi et al., 2020). A Norwegian study also reported that some households avoided treatment due to financial difficulties, particularly among families with multiple children or single-parent households (Rukke et al., 2012). Variations in the financial burden across countries may be influenced by differences in per capita income, healthcare accessibility, availability of free treatment services, and public health support systems. For example, some countries such as the United Kingdom provide facilitated access to free head lice treatment services (Ibarra et al., 2007).

Factors associated with HLI

The present study identified age, number of family members, monthly family income, and sharing of personal combs with others as significant predictors of HLI. Among these, having a larger number of family members and sharing personal combs emerged as significant risk factors, while older age and higher monthly family income acted as protective factors against HLI.

The positive association between larger family size and HLI observed in the present study is supported by reported findings which suggested that children living in larger households are more likely to experience head lice infestation (Delie et al., 2024). Increased family size may facilitate close physical contact, sharing of personal items, and overcrowded living conditions, thereby increasing the opportunities for transmission within households. However, some previous studies conducted in Yemen and Iran did not identify family size as a significant factor associated with HLI (Bamaga et al., 2021; Firoozfar et al., 2019). Such discrepancies may be related to differences in cultural practices, household environments, socioeconomic conditions, and study methodologies across populations.

Monthly family income was identified as a protective factor against HLI in the present study, indicating that children from families with higher income levels were less likely to be infested. Higher income may contribute to improved living conditions, better access to hygiene facilities, and greater affordability of preventive and treatment measures. Nevertheless, certain previous studies have reported no significant association between family income and HLI (Bamaga et al., 2021; Firoozfar et al., 2019). Variations in findings may reflect differences in economic structures, public health support systems, and access to healthcare services among countries.

Age also emerged as a significant protective factor in the current study, with 10-year-old girls demonstrating a lower likelihood of infestation compared with 9-year-old girls. Older children may have comparatively better personal hygiene practices, increased awareness regarding head lice prevention, and reduced close-contact play behaviors. In contrast, a study conducted in Indonesia reported that age was not significantly associated with HLI (Sukesi, 2024). This inconsistency may be due to variations in sample size, age distribution, and sociocultural characteristics of the study populations.

The present study further identified sharing of personal combs with others as a significant risk factor for HLI. Sharing grooming items may facilitate indirect transmission of lice

and viable nits among family members and peers. Similar findings have been reported in a study conducted in India, where sharing personal items was significantly associated with infestation (Saraswat et al., 2020). However, studies conducted in Iran did not demonstrate a significant relationship between sharing personal items and HLI (Firoozfar et al., 2019). Such differences may reflect variations in household hygiene practices and cultural behaviors regarding the sharing of personal belongings.

Several variables assessed in the present study, including bathing frequency, cleansing agents used for hair, frequency of comb cleaning, and hair length, were not significantly associated with HLI. Comparable findings regarding hair length were reported in studies conducted in Iran, Turkey, and Jordan, where no significant relationship between hair length and HLI was observed (Alzain, 2012; Khamaiseh, 2018; Salehi et al., 2014). In contrast, studies conducted in India and Yemen reported higher infestation rates among girls with longer hair (Bamaga et al., 2021; Saraswat et al., 2020;). These conflicting findings may be due to differences in hair care practices, cultural norms, and methods used to categorize hair length across studies.

Furthermore, the present study did not identify significant associations between HLI and sleeping arrangements, such as sharing a bed or sleeping alone, which is consistent with previous reported findings (Souza et al., 2022). Inverse associations identified in previous studies between HLI and factors such as parental educational level, availability of bathing facilities, and number of bedrooms were also generally aligned with the trends observed in the present study (Bamaga et al., 2021; Firoozfar et al., 2019; Saraswat et al., 2020).

Implications

The findings of this study strongly support the need for development of health policies targeting pediculosis among school children. Establishing comprehensive health education programs for the school community, including children, parents, and teachers, is recommended. These programs should focus on head lice transmission, early diagnosis, management of affected children, prevention through appropriate hygiene practices, treatment options, and evaluation of intervention effectiveness.

Incorporating routine head lice screening sessions into existing school medical inspection programs conducted through the Medical Officer of Health and Regional Director of Health Services may further strengthen early detection and disease control efforts. In addition, future interventional studies assessing outcomes before and after educational programs are recommended to evaluate the effectiveness of such interventions and to further guide evidence-based strategies for the prevention and management of HLI among school children.

Strengths and limitations

Being the first study conducted on HLI among primary school girls in Southern Sri Lanka, the present study provides valuable baseline evidence for researchers, healthcare professionals, and policymakers to strengthen evidence-based practice and

future public health interventions related to HLI.

A major strength of this study was that the prevalence of HLI was determined through direct scalp examination conducted by the investigator rather than relying solely on parental responses to questionnaires. This approach enhanced the accuracy and reliability of prevalence estimation.

However, several limitations should be considered when interpreting the findings. Although participants were selected using a multistage cluster sampling method, the study was conducted only among grade four and grade five girls within the Galle Educational Division, which represents a limited geographical area. Therefore, broader large-scale studies are required to improve the generalizability of the findings to other regions of Sri Lanka.

In addition, one of the major practical challenges encountered during data collection was ensuring adequate privacy for students during scalp examinations within busy school environments. Furthermore, dermatological conditions associated with HLI, such as eczema and other scalp-related complications, were not assessed as part of the disease burden evaluation.

The response rate of the study was 90.5%. Non-response was mainly due to participant refusal and school absenteeism during the limited data collection period.

Conclusions

The present study revealed a high prevalence of HLI among primary school girls in the Galle Educational Division, Southern Sri Lanka, indicating that HLI remains a significant public health concern among school-aged children. The findings demonstrated that HLI imposes a considerable physical, psychological, educational, social, and economic burden on affected children and their families. Difficulties in concentration, sleep disturbances, stigma, and concerns regarding academic performance were commonly reported among infested children.

Several factors were identified as significant predictors of HLI, including larger family size and sharing of personal combs, while older age and higher monthly family income appeared to be protective factors. The findings further highlighted the need for improved parental awareness and health education.

The study emphasizes the importance of implementing school-based screening programs, parental health education, early detection strategies, and community-level interventions to reduce the burden of HLI among primary school children. Strengthening school health services and promoting appropriate hygiene and treatment practices may contribute to the effective prevention and control of head lice infestation in Sri Lanka

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Conflict of interest

All authors declared that they have no conflicts of interest.

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