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Menstrual Hygiene Practices Among School Students in a District of the Northern Province, Sri Lanka: A Cross-Sectional Study

Pakeerathan Kanagaratnam[1], Pethurupillai A. D. Coonghe[2]

[1] PG Scholar, Department of Public Health, Faculty of Medicine, University of Kelaniya, Kelaniya, Sri Lanka; Medical Offcer, Department of Radiology, Teaching Hospital Jaffna, Jaffna, Sri Lanka.

[2]Senior Lecturer, Department of Family and Community Medicine, Faculty of Medicine, University of Jaffna, Sri Lanka.

Original Article

Abstract

Introduction: Menstrual hygiene (MH) is vital for the health, dignity, and academic performance of adolescent girls, particularly in resource-constrained regions. Sociocultural, economic, and infrastructural factors shape MH practices. This study examines MH practices among students aged 16 in District of Northern Province, Sri Lanka, exploring the influence of sociodemographic factors, school facilities, and related challenges. To investigate menstrual hygiene practices and their association with sociodemographic characteristics among students aged 16 in District of Northern Province, Sri Lanka.

Methods: A descriptive cross-sectional study was conducted over 4-5 months in 2024, targeting students aged 16 across 82 schools in district of northern province. Using stratified random sampling, 385 students were selected. Data were gathered via a structured questionnaire assessing MH practices and an observation checklist evaluating school sanitation facilities. Descriptive statistics and chi-square tests were employed for analysis.

Results: The sample was predominantly Hindu 75.1% (n=289), with mothers often more educated than fathers, positively influencing menstrual hygiene (MH) management. Most families 73.5% (n=283) earned below 25,000 LKR monthly, limiting access to sanitary products. While 92.2% (n=355) had home toilet access, only 76.5% (n=13) of schools had adequate girls' toilets, and 47.1% (n=8) provided proper sanitary disposal. Comfort discussing menstruation was moderate, with 70.9% (n=273) somewhat comfortable and 24.4% (n=94) very comfortable. Sanitary pads were universally preferred, with 100% using them during school hours, indicating a positive MH shift.

Discussion: Significant deficiencies in school MH infrastructure, including private toilets, disposal systems, and water access, were identified. Educational initiatives to reduce menstrual stigma and promote open dialogue are critical. Comprehensive interventions, including infrastructure upgrades and awareness programs, are essential to improve MH practices and support students' health and education.

Key Words: Menstrual Hygiene, Adolescent Girls, School Sanitation Facilities, Sociodemographic Factors, Northern Province

Corresponding Author: Pakeerathan Kanagaratnam kkpakeerathan@gmail.com

Introduction

Menstrual hygiene is a vital component of adolescent health, profoundly impacting physical health, educational attainment, and gender equity worldwide. Menstruation, a natural biological process signaling the onset of womanhood, involves a sophisticated hormonal cascade orchestrated by the hypothalamus, pituitary gland, ovaries, and uterus, Recent studies indicate that the median age at menarche in urban Sri Lankan girls is now approximately 13-13.5 years, with girls in better socio economic and nutritional environments experiencing it even earlier (~11.8 years). These figures suggest a downward secular trend compared to earlier decades [1]. Menstruation is a natural biological process marking reproductive maturity in adolescent girls. Its management is influenced by a range of socio-cultural, economic, and infrastructural factors, which are critical to adolescent health, education, and overall well-being [1,2].

Globally, menstruation is often steeped in cultural taboos, myths, and stigma, fostering shame and misunderstanding. These societal attitudes shape menstrual hygiene practices, which remain an under addressed public health concern [3,4]. Challenges in menstrual management vary significantly due to socio-economic disparities, cultural norms, and inadequate infrastructure. In low- and middle-income countries, limited access to hygienic menstrual products, clean water, and sanitation facilities hinders effective menstrual hygiene, increasing risks of urinary tract infections (UTIs), reproductive tract infections (RTIs), and other gynecological issues [1,5,6]. Such health challenges can impair long-term reproductive health, potentially contributing to infertility [3,7].

Menstrual hygiene also intersects with education and gender equality (6,8). The absence of adequate sanitation facilities, coupled with stigma and lack of affordable menstrual products, leads to school absenteeism among girls, with United Nations Educational, Scientific and Cultural Organization (UNESCO) estimating that one in ten girls in Africa misses' school during menstruation [2,9]. This disrupts academic progress, increases dropout rates, and perpetuates gender disparities [10]. Economically, the cost of menstrual products strains household budgets in impoverished communities, forcing many to resort to unsafe alternatives like rags or leaves. Infrastructure gaps, such as the lack of private toilets and waste disposal systems, further complicate hygienic menstrual management [3,11,12].

Global initiatives, including those by United Nations International Children's Emergency Fund (UNICEF), World Health Organization (WHO), and Non-Government Organizations (NGOs), advocate for improved menstrual health through education, product access, and policy reform. Events like Menstrual Hygiene Day (May 28) aim to destigmatize menstruation and foster inclusive dialogue [13]. Innovations such as menstrual cups and reusable pads, alongside digital platforms for education, are transforming menstrual hygiene management, offering sustainable and accessible solutions [9,14,15].

In Sri Lanka, menstruation is deeply entwined with cultural traditions, shaping perceptions and practices. Often viewed as a taboo, menstruation lacks open discussion, perpetuating misconceptions and inadequate hygiene practices. Socio-economic barriers exacerbate these issues, particularly for low-income families who struggle to afford sanitary products, resorting to unhygienic alternatives [2,13-17]. Educational institutions frequently lack proper sanitation facilities and menstrual health education, hindering effective management [18].

Efforts by NGOs, international agencies, and local groups aim to address these challenges through education, product distribution, and advocacy. Despite progress, rural and marginalized communities often remain underserved [7,19]. Cultural beliefs imposing restrictions on menstruating girls, such as limiting social or educational participation, further entrench gender inequality [17,20,21]. Recent advancements, including affordable reusable products and digital education platforms, are fostering greater awareness and accessibility, yet sustained efforts are needed to ensure all girls manage menstruation with dignity [5,22].

Sri Lanka's Northern Province, scarred by decades of civil conflict, faces unique challenges in menstrual hygiene management. The war disrupted healthcare and education infrastructure, particularly in areas like district of Northern Province, Sri Lanka, leaving schools without adequate sanitation or clean water [12, 23, 24]. Cultural stigmas surrounding menstruation limit open dialogue, contributing to poor hygiene practices and health risks [25]. Poverty and economic instability restrict access to menstrual products, while limited healthcare services hinder menstrual health education and support [3,26].

The lack of proper facilities leads to school absenteeism among girls, undermining educational outcomes. NGO and government initiatives strive to improve conditions, but funding and logistical barriers persist [27]. Rebuilding infrastructure, enhancing menstrual health education, and challenging are critical to improving menstrual hygiene in the Northern Province.

The study district, at the heart of the Northern Province, grapples with the legacy of conflict, poverty, and inadequate infrastructure. Schools often lack separate, well-maintained toilets and clean water, making menstrual management challenging for adolescent students. Cultural stigma and methods, limited education foster poor hygiene practices, compounded by psychological stress from post-conflict trauma [13,18,28,29]. Many girls rely on unhygienic absorbents due to financial constraints, facing social isolation and emotional distress during menstruation.

This study explores the menstrual hygiene practices, challenges, and support systems among aged 16 years girls in a district of the Northern Province, Sri Lanka, aiming to inform policies that uphold their dignity and well-being. By addressing infrastructural, cultural, and educational barriers, it seeks to empower girls to navigate menstruation confidently in a post-conflict context [18,30].

Menstrual hygiene practices depend on the choice of absorbents, influenced by cost, availability, and cultural preferences. Reusable cloth pads are common in rural areas for their affordability and sustainability, requiring proper washing and drying [31]. Commercial sanitary pads dominate urban settings for convenience but are costlier and less eco-friendly [32]. Menstrual cups and reusable tampons offer sustainable alternatives, though awareness and initial costs limit adoption. Innovative products like bamboo, banana fiber, and water hyacinth pads provide eco-friendly options, while disposable products contribute to environmental waste [26,33]. Promoting access to sustainable absorbents is key to improving hygiene and reducing environmental impact [34].

Menstrual hygiene is a critical public health issue with far-reaching implications for adolescent girls' health, education, and empowerment, particularly in district of Northern Province, Sri Lanka, a region marked by post-conflict challenges. Poor hygiene practices increase risks of infections like UTIs and RTIs), which can lead to subfertility

and long-term health issues [18, 35, 36]. Absenteeism due to inadequate facilities and stigma hinders academic progress and perpetuates gender inequality. This study addresses gaps in understanding menstrual hygiene practices among at the age of 16 years, offering evidence to guide targeted interventions, improve access to products, and foster gender equity.

Menstrual hygiene involves using clean menstrual products (e.g. pads, tampons, cups), maintaining personal hygiene through regular changes and washing, and ensuring hygienic disposal of menstrual waste. Access to clean water, sanitation facilities, and private spaces is essential to manage menstruation with dignity, minimizing health risks and environmental impact [37-40].

This cross-sectional study investigated menstrual hygiene practices among students who are at the age of 16 years in a district of the Northern Province, Sri Lanka, with a focus on their relationship to sociodemographic characteristics. Recognizing that menstrual hygiene is a vital component of adolescent health and education, the study aimed to describe existing practices, identify challenges and barriers in menstrual hygiene management, and evaluate how factors such as age, parental education, family income, and access to basic sanitation facilities influenced these practices.

Materials and Methods

A descriptive cross-sectional study was conducted over a five-month period in 2024 to assess menstrual hygiene practices among 16-year-old students in a district of the Northern Province, Sri Lanka. The study population included students who had attained menarche at least six months prior, were regularly attending school, and provided informed assent and parental consent. Students who did not meet these criteria, or who were absent, ill, or unwilling to participate, were excluded.

This district of the Northern Province in Sri Lanka comprises 82 secondary schools distributed across four administrative divisions. Schools were stratified by division and type (National, Type 1AB, Type 1C), and 17 schools were selected as multistage cluster samples to ensure representativeness across geographical and socio-economic strata. Within each selected school, eligible students were systematically sampled from class registers. The required sample size was calculated using a single population proportion formula for simple random sampling [2,5,42]:

$$n = \frac{Z^2 \cdot p(1-p)}{E^2}$$

The required sample size was determined using the single population proportion formula, assuming a 95% confidence level (Z=1.96), a proportion (p) of 0.5 to ensure maximum variability, and a 5% margin of error (E=0.05), resulting in 385 participants. Here, the *confidence level* refers to the probability that the estimated range contains the true population value, the *margin of error* indicates the range of uncertainty, and the *proportion* represents the estimated prevalence of the characteristic being studied. Although cluster sampling was employed, a design effect was not applied due to logistical constraints.

Two instruments were used: a self-administered questionnaire comprising 10 items assessing menstrual hygiene knowledge and practices, and a 24-item observation checklist evaluating school-based menstrual hygiene facilities. A pilot test with 15 students from three schools yielded Cronbach's alpha values of 0.805 for the questionnaire and 0.927 for the checklist, indicating strong internal consistency.

Data collection was conducted by trained Development Officers from the Zonal Education Department, experienced in adolescent counselling. Data collection was facilitated by trained Development Officers from the Zonal Education Department who possess experience in adolescent counselling and health-related school programmes.

Although monetary compensation was not provided, their involvement was secured through official approval from the Zonal Education Director, recognizing the public health importance of the study. These officers were willing to participate voluntarily as part of their broader commitment to student welfare and community-based educational initiatives. Their familiarity with the school environment and ability to build rapport with adolescents ensured ethical, respectful, and effective data collection, especially given the sensitive nature of menstrual hygiene topics. Questionnaires were completed in classroom settings, with officers available for clarification. Facility observations were conducted concurrently using the checklist. Ethical clearance was obtained from the Ethics Review Committee, Faculty of Medicine, University of Kelaniya (Ref: P/03/01/2024). Participation was voluntary, with confidentiality assured.

Data was entered into Microsoft Excel, cleaned, and analyzed using IBM SPSS Statistics version 26. Descriptive statistics (frequencies, means, standard deviations) summarized participant responses. Associations between categorical variables were examined using Chi-square tests, with statistical significance set at $p<0.05$.

Results

This chapter presents the findings of a descriptive cross-sectional study conducted in 2024 to assess menstrual hygiene practices among 385 students aged 16 years, selected through a multistage cluster sampling technique from 17 of the 82 government schools in a district of the Northern Province, Sri Lanka. w

Socio-Demographic Characteristics

Table 1. Socio-Demographic Characteristics of Students

Variable	Category	Frequency (n)	Percentage (%)
Religion	Hindu	289	75.1
	Christian	93	24.2
	Muslim	3	0.8
Father's Education Level	Primary education	154w	40.0
	Ordinary Level (O/L)	172	44.7
	Advanced Level (A/L)	38	9.9
	University degree	3	0.8
Mother's Education Level	Primary education	109	28.3
	Ordinary Level (O/L)	182	47.3
	Advanced Level (A/L)	73	19.0
	University degree	12	3.1
Monthly Family Income (LKR)	< 25,000	283	73.5
	25,000-50,000	81	21.0
	> 200,000	6	1.6
	Other / Not specified	15	3.9

As described in Table 1, the sample is predominantly Hindu 75.1% (n=289), followed by Christian 24.2% (n=93) and Muslim 0.8% (n=3). Hindu cultural norms likely shape menstrual hygiene practices, influencing attitudes and taboos. Most fathers, 44.7% (n=172) and mothers, 47.3% (n=182), have Ordinary Level education, with 40.0% (n=154) of fathers and 28.3% (n=109) of mothers having primary education.

Mothers show higher attainment, with 19.0% (n=73) at Advanced Level and 3.1% (n=12) with university degrees, compared to 9.9% (n=38) and 0.8% (n=3) for fathers. Maternal education may enhance health literacy, benefiting daughters' hygiene practices.

A majority, 73.5% (n=283) of families earn less than 25,000 LKR monthly, reflecting economic hardship. Only 21.0% (n=81) earn 25,000-50,000 LKR, with minimal representation in higher brackets (1.6% >200,000 LKR).

Low income restricts access to menstrual products, potentially leading to less hygienic alternatives and impacting attendance. Continuing from the previous description, the dataset highlights a group of young individuals, predominantly adolescents, with an average age of 15.3 years Standard Deviation (SD)= 0.684).

The mean age at menarche, 12.97 years (SD=1.271), reflects a typical range for the onset of menstruation, though with some variation. The average duration of menstrual periods is 5.38 days (SD=1.273), indicating moderate consistency in cycle length.

Family composition shows an average of 1.14 sisters (SD=0.992) and 1.2 brothers (SD=0.956), suggesting slightly larger numbers of male siblings in relatively small families. These metrics provide a concise snapshot of the demographic and physiological characteristics of the group studied.

Table 2. Overview of basic factors related to students' menses

Variable	Response Category	Frequency (n)	Percentage (%)
Covered toilet facility at home	Yes	355	92.2
	No	30	7.8
Menarche attained	Yes	383	99.5
	No	2	0.5
Length of menstrual cycle	< 28 days	252	65.5
	28-32 days	129	33.5
	> 32 days	4	1.0
Comfort discussing menstrual hygiene	Somewhat comfortable	273	70.9
	Very comfortable	94	24.4
	Not comfortable	18	4.7
Mean age of participants	-	15.3 years	(SD=0.684)
Mean age at menarche	-	12.97 years	(SD=1.271)
Average menstrual duration	-	5.38 days	(SD=1.273)
Average number of sisters	-	1.14	

The dataset reveals that 92.2% (n=355) of students have covered toilets at home, aiding hygienic menstrual management, while 7.8% (n=30) without such facilities face privacy and infection risks. Nearly all 99.5% (n=383) have attained menarche, highlighting the need for menstrual hygiene support, with only 0.5% (n=2) yet to reach it.

Menstrual cycles vary, with 65.5% (n=252) shorter than 28 days, 33.5% (n=129) between 28-32 days, and 1.0% (n=4) longer than 32 days, indicating diverse product needs. Comfort discussing menstrual hygiene is moderate, with 70.9% (n=273) somewhat comfortable, 24.4% (n=94) very comfortable, and 4.7% (n=18) not comfortable, suggesting persistent stigma and a need for fostering open conversations.

Menstrual Absorbents and Practices

Table 3. Menstrual Absorbents and Practices

Variable	Response	Frequency (n)	Percentage (%)
Type of absorbent used in schools	Sanitary pads	385	100.0
	Cloth	0	0.0
Frequency of changing absorbents	Every few hours	135	35.1
	Once daily	44	11.4
	Less than daily	114	29.6
	Not sure	92	23.9
If cloth were used: drying method	Dried indoors	58	15.1
	Dried outdoors	327	84.9
If cloth were used: storage method	Not stored cleanly	221	57.4
	Stored cleanly	164	42.6
Disposal method of used sanitary materials	Thrown into the trash	129	33.5
	Burned	129	33.5
	Flushed down the toilet	69	17.9
	Buried	22	5.7
	Other (e.g., river, pit, etc.)	36	9.4

According to Table 3, all students 100% (n=385) use sanitary pads, indicating strong accessibility or cultural preference, though the lack of cloth use may reflect distribution programmes while raising environmental concerns due to disposable waste.

Only 35.1% (n=135) change pads every few hours, while 11.4%(n=44) change once daily, 29.6% (n=114) less frequently, and 23.9% (n=92) are unsure. suggesting that limited facilities or supplies may contribute to infrequent changes, increasing infection risks.

If cloths were used, 15.1% (n=58) would dry them indoors, risking bacterial growth, and 57.4% (n=221) would not store them cleanly, underscoring the need for education on reusable absorbents. Disposal practices are varied, with 33.5% (n=129) using trash, 33.5% (n=129) burning, 17.9% (n=69) flushing, 5.7% (n=22) burying, and 9.4% (n=36) using other methods; flushing and burning pose environmental and infrastructural challenges, highlighting the need for improved disposal facilities.

Menstrual Hygiene Practices

Table 4. Menstrual Hygiene Practice of Students

Hygiene Practice	Response	Frequency (n)	Percentage (%)
Daily bathing during menstruation	Yes	385	100.0
Cleaning the genital area before sleep	Yes	382	99.2
Use of water for genital cleaning	Yes	369	95.8
Handwashing after using the toilet	Yes	383	99.5
Handwashing with soap after changing absorbents	Yes	381	99.0
Use of separate undergarments during menstruation	Yes	383	99.2

As illustrated in Table 4, students exhibit strong hygiene practices 100% (n=385) bathe daily, 99.2% (n=382) clean genitalia before sleep, 95.8% (n=369) use water for genital cleaning, 99.5% wash hands after toilet use, 99.0% (n=381) wash hands with soap after changing absorbents, and 99.2% (n=383) use separate undergarments. The small minority not in adherence may face resource or awareness gaps, but overall, practices are robust.

School Menstrual Hygiene Facilities (Student Perspective)

In this study, 95.3% (n=367) of students reported that health and physical education were included in their school curriculum, suggesting broad coverage of menstrual health topics, though the 4.7% (n=18) gap may reflect inconsistent implementation or awareness.

Despite this, only 68.3% (n=263) of students had access to clean water and sanitation facilities during menstruation at school, indicating a significant infrastructural shortfall. While 76.4% (n=294) perceived no deficiencies in menstrual hygiene resources, 23.6% (n=91) identified existing gaps.

Reported challenges included inadequate water and toilet cleanliness 52.0% (n=200), stigma and shame 22.0% (n=85), school absenteeism 15.8% (n=60), and fear of sudden leakage 10.2% (n=40), revealing both structural and socio-cultural barriers.

Statistical analysis demonstrated significant associations between access to water and sanitation facilities and key hygiene behaviours, including absorbent changing practices ($p=0.002$), pad change frequency ($p<0.001$), and disposal methods ($p=0.018$), underscoring the need to improve school infrastructure to support effective menstrual hygiene management.

We can observe from Table 5 that, while 76.5% (n=13) of schools provide adequate separate toilets, only 64.7% (n=11) have locks, 52.9% (n=9) maintain cleanliness, and 47.1% (n=8) offer disposal bins, compromising hygiene and privacy.

School Toilet Facilities

Table 5. Access to Clean and Functional Toilets

Variable	Yes (%)	No (%)
An adequate number of toilets for girls	76.5 (n=13)	23.5 (n=4)
Locks on toilet doors	64.7 (n=11)	35.3 (n=6)
Regular toilet maintenance	52.9 (n=9)	47.1 (n=8)
Proper disposal bins are available	47.1 (n=8)	52.9 (n=9)

Table 6 illustrates that the majority of schools, 88.2% (n=15), provide access to clean and safe water near toilet facilities, supporting menstrual hygiene management, though 11.8% (n=2) lack this resource. However, only 64.7% (n=11) of schools offer soap and handwashing facilities with running water, leaving 35.3% (n=6) without adequate means for proper hygiene, which could increase health risks for students during menstruation.

Table 6. Water Supply

Variable	Yes (%)	No (%)
Clean and safe water near toilets	88.2 (n=15)	11.8 (n=2)
Soap and handwashing with running water	64.7 (n=11)	35.3 (n=6)

As indicated in Table 7, while 82.4% (n=14) provide privacy features, only 58.8% (n=10) have changing spaces, 70.6% (n=12) offer adequate lighting/ventilation, and 52.9% (n=9) provide seating, indicating gaps in comfort. Only 41.2% (n=7) of schools have sanitary napkin dispensers or vending machines, limiting access to menstrual products, while 82.4% (n=14) offer emergency supplies, indicating stronger support for addressing unexpected menstruation, though 17.6% (n=3) still lack such provisions.

Just over half of schools, 52.9% (n=9), have proper disposal systems for used sanitary materials and regular hygienic waste collection, while 47.1% (n=8) lack these facilities, posing hygiene risks. Additionally, 58.8% (n=10) provide clear instructions for students on disposing of sanitary materials, but 41.2% (n=7) do not, indicating significant gaps in effective waste management practices.

Privacy and Comfort

Table 7. Privacy and Comfort

Variable	Yes (%)	No (%)
Designated changing space	58.8 (n=10)	41.2 (n=7)
Adequate lighting/ventilation	70.6 (n=12)	29.4 (n=5)
Resting/seating provision	52.9 (n=9)	47.1 (n=8)
Privacy curtains/doors	82.4 (n=14)	17.6 (n=3)

Education and Awareness

Table 8. Education and Awareness

Variable	Yes (%)	No (%)
MH awareness materials displayed	5.9 (n=1)	94.1 (n=16)
Training/workshops for girls	29.4 (n=5)	70.6 (n=12)
Library resources on menstruation	29.4 (n=5)	70.6 (n=12)

According to Table 8, only 5.9% (n=1) display MH education materials, and 29.4% (n=5) offer training or library resources, highlighting a critical lack of educational support.

In this study, the majority of schools demonstrated strong support for menstrual hygiene (MH) infrastructure, with 88.2% (n=15) to 94.1% (n=16) of respondents affirming the availability of essential provisions, including access to facilities for female staff, regular maintenance, collaboration with local health authorities, availability during school events, accommodations for menstrual discomfort, and the promotion of a non-stigmatizing environment.

Furthermore, 76.5% (n=13) reported that school infrastructure was accessible to students with disabilities. However, notable gaps remain; only 41.2% (n=7) of schools had systems in place for student feedback on MH facilities, and 23.5% (n=4) lacked infrastructure that is fully accessible to students with disabilities. These findings highlight the need for targeted improvements to ensure inclusive and responsive MH support within school settings.

Discussion

This study investigated menstrual hygiene practices among 385 female students aged 16 years and evaluated the state of menstrual hygiene (MH) facilities in 17 schools across a district in the Northern Province of Sri Lanka. One of the most notable findings was the universal use of disposable sanitary pads (100%) during school hours, indicating widespread availability, accessibility, and cultural acceptance of these products among adolescent girls in this post-conflict region. This represents a marked improvement in MH product usage compared to previous reports and signals meaningful progress in ensuring menstrual health in school environments.

Importantly, while the data confirmed 100% pad use during school hours, this does not necessarily imply exclusive pad use in all settings. These aimed to provide a broader perspective on students' experiences and challenges beyond the school setting, particularly in home environments or during emergencies. This approach allowed for a more nuanced assessment of menstrual hygiene practices among adolescent girls in the region.

Despite this, challenges remain in actual hygiene practices and facility adequacy. For example, only 35.1% of participants changed pads every few hours, while a notable proportion changed pads less frequently or were unsure of their changing habits, suggesting barriers to optimal MH management.

Additionally, although 95.3% of students received menstrual hygiene education, the effectiveness of these programmes is likely compromised by deficiencies in school

sanitation infrastructure. Only 68.3% of schools provided clean water and sanitation, 52.0% had unclean toilets, and less than half (47.1%) had adequate disposal facilities, echoing infrastructure concerns noted by Chandra-Mouli *et al*.

The sample predominantly reflected regional socio-cultural characteristics, with 75.1% identifying as Hindu and 4.7% reporting discomfort discussing menstruation, underscoring the persistence of cultural stigma that may hinder open MH dialogue [32, 39]. Parental education, especially maternal, was positively associated with better MH practices, while lower paternal education correlated with limited resource access, consistent with findings by Sivakami *et al*. and Tamphasana *et al* [33, 39].

Economic constraints were evident, with 73.5% of families earning below LKR 25,000 monthly, significantly linked to the use of less hygienic menstrual products in other studies ($\chi^2 = 12.34$, df=1, $p = 0.006$) [35,36, 41], though this was not observed here due to the universal pad use.

Individual hygiene behaviours were strong; 100% reported daily bathing, and 99.5% practised handwashing after toilet use. However, gaps in home sanitation persist, as 7.8% lacked access to covered toilets, increasing infection risk, findings consistent with the report of UNICEF and WaterAid [42,43].

Finally, while disposable pad use is near universal, environmental concerns arise from improper disposal amid inadequate waste management systems. Overall, this study highlights substantial progress in menstrual product use but emphasizes the need to improve sanitation infrastructure and address socio-cultural barriers to optimize menstrual hygiene practices in schools.

Conclusion

To address existing gaps, schools must ensure the provision of separate, clean, and lockable toilets for girls, equipped with covered disposal bins, water, and soap. While the study examined changing frequency and disposal practices, it did not include specific questions on the degree of absorbent saturation (e.g., whether pads were soaked or leaking), which may be relevant to understanding hygiene behaviour more comprehensively.
Infrastructure should accommodate students with disabilities, incorporating ramps and adapted facilities. MH education should be integrated into the curriculum, covering product use, disposal, and stigma reduction, with inclusive workshops engaging both male and female students.

Public-private partnerships are needed to subsidize reusable menstrual products, such as menstrual cups, coupled with hygiene education and support programmes [18,35, 38]. The Zonal Education Directorate should institutionalize MH policies, allocate funding for facility upgrades, and implement regular monitoring and evaluation. Training for teachers and feedback mechanisms for students would further enhance MH support in schools.

This study focused exclusively on 16-year-old students, limiting generalizability to other age groups. The reliance on self-reported data introduces potential biases, particularly underreporting due to stigma. As a cross-sectional study, it captures data at a single point in time and cannot establish causality or track changes over time. Additionally, its school-centric design excludes home and community-level influences on MH practices [5,7,41,42,43].

Adolescent girls in a district of the Northern Province in Sri Lanka demonstrate commendable personal hygiene practices. However, inadequate school facilities and economic barriers remain significant impediments to optimal menstrual health.

Addressing these challenges requires coordinated efforts among educational authorities, public health stakeholders, NGOs, and communities. Sustainable infrastructure development, comprehensive MH education, and equitable access to menstrual products are essential to safeguarding the health, dignity, and educational attainment of schoolgirls in resource-limited settings.

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Conflicts of Interest

Authors declare that there are no conflicts of interest.

Data Availability Statement

Data is available on reasonable request. Raw data without personal identifiers is available from the corresponding author upon reasonable request.

Use of Artificial Intelligence Assisted Technologies

During the preparation of this work, the authors used generative AI in order to improve the language and readability. After using this tool/service, the authors reviewed and edited the content as needed and take full responsibility for the content of the publication.

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