

Menstrual Knowledge, Cultural Restrictions, and School Absenteeism among Adolescents in Congolese Slums: An Evidence-Based Study

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Abstract:

Background: Adolescent girls in Congolese slums face significant Menstrual Hygiene Management (MHM) challenges due to limited infrastructure and cultural taboos. This study investigated menstrual knowledge, socio-cultural restrictions, and their impact on school absenteeism in the Masina and Kimbaseke districts of Kinshasa.

Methods: A mixed-methods cross-sectional study was conducted involving 136 adolescent girls (aged 15–19). Quantitative data were collected via surveys, supplemented by qualitative insights from teachers and peers. Participants were selected using multi-stage sampling (convenience sampling for schools and random sampling for individuals). Data were analyzed using descriptive statistics and multivariable logistic regression.

Results: Only 46.4% (95% CI: 38.2%–54.8%) of participants demonstrated good menstrual knowledge. Significant predictors of good knowledge included maternal secondary education (AOR=4.55; 95% CI: 1.32–15.65) and media access (AOR=3.01; 95% CI: 1.05–8.62). While 66.2% used disposable pads, 22.8% reported frequent unaffordability. Cultural restrictions were pervasive, with 79.4% barred from religious activities. Crucially, 24.5% (95% CI: 17.8%–32.4%) of students reported menstruation-related school absenteeism. Furthermore, school WASH infrastructure was critically deficient; 0% of schools provided a consistent supply of water or soap.

Conclusions: Menstrual health barriers significantly impede the education of girls in Congolese slums. Effective interventions must prioritize comprehensive menstrual education, improve the affordability of hygiene products, and upgrade school WASH facilities. Addressing these systemic issues is vital for achieving gender equity in education and improving the psychosocial well-being of adolescent girls in low-resource urban settings.

Keywords: Menstrual knowledge, Adolescents, School absenteeism, Cultural restrictions, Hygiene management, DR Congo.

Introduction

Women and girls are disproportionately affected by the lack of access to basic water, sanitation and hygiene facilities, due to their needs during the period of increased vulnerability to infection around menstruation and reproduction. The sustainable development goals (SDGs) attempts connecting water, sanitation and hygiene (SDG 6) through target 6.2, which point out access to decent sanitation and hygiene, and the necessities of women and girls.[1,2] Menstrual-related problems are one of the most common problems among adolescent girls and might have an adverse effect on their performance in academics and other activities of daily life which may lead to school absenteeism during menstrual days.[3] Being absent from school due to menstruation-related issues during the menstruation is called School absenteeism during menstruation.[4]

Menstrual hygiene management plays a crucial role in shaping the educational outcomes of girls in low- and middle-income countries. Qualitative studies have highlighted numerous barriers [5-15] influencing a wide range of social and educational outcomes [16-19]. In contrast, quantitative research-particularly studies employing impact evaluations-has been slower to develop, both in the scope of interventions examined and in assessing their diverse effects [17, 20-26]. Notable exceptions include a recent feasibility study that adopted a comprehensive approach, combining multiple interventions such as distributing vouchers for pain relief and encouraging community dialogues to reduce menstrual stigma [27]. Nevertheless, the study's design limited its ability to distinguish the effects of individual components, and its latrine construction initiative did not directly address menstrual hygiene management [28]. We draw on the approach used by Malhotra et al. (2016) [29] in their study from Uttar Pradesh. While Malhotra et al. (2016) [29] was essential in identifying the constraints faced by girls during menstruation and exploring them through rigorous multivariate analysis, our study aims to

highlight the necessity of quantifying the relative impact of various menstruation-related constraints on educational outcomes. From a global [30] perspective, the onset of menstruation (i.e., *menarche*) occurs around the age of 12–13, marking a bodily transition from childhood into adulthood. Menstruation is often accompanied by pain and discomfort. Symptoms such as menstrual pain and heavy bleeding impact individuals' health, quality of life and participation in school and work [32-34]. Menstrual-related symptoms risk reinforcing gender inequalities regarding, for instance, subjective well-being [31], economic status and social engagement [35]. In Afghanistan, Bangladesh, Bhutan, Sri-Lanka, girls are missing classes at least one to two days during menstruation [36].

In South Africa, the importance of providing menstrual hygiene support for girls gained national attention when former President Jacob Zuma emphasized the need for access to sanitary towels in his 2011 presidential address. His remarks triggered widespread public discussion on menstrual product availability and affordability. Since then, the government has taken several steps to improve access.

Three provinces, Mpumalanga, Eastern Cape, and KwaZulu-Natal were selected as pilot regions for a programme aimed at supplying free sanitary pads to students in no-fee schools, with implementation planned for November 2019. Another significant milestone in expanding access came in April 2019, when the government removed Value Added Tax (VAT) on sanitary pads. This policy change was announced by the then Minister of Finance, Tito Mboweni, during the Medium-Term Budget Policy Statement, marking a key step toward making menstrual products more affordable for women and girls across the country. This paper offers four key contributions to the existing literature. First, it gathers and distinguishes between the underlying reasons for menstruation-related school absenteeism and reduced classroom engagement. Second, it examines girls' self-reported explanations for

missing school and experiencing changes in focus or participation, aiming to identify the most significant constraints. Third, it introduces a cross-sectional analytical framework designed to measure each type of limitation, assess their relative influence, and provide direction for future investigations. Finally, it deepens our understanding of how socio-cultural barriers-such as household restrictions and fears of harassment, embarrassment, or sexualization from peers and teachers-shape educational outcomes, using confidential surveys of a large sample of girls to generate novel prevalence estimates of period-related teasing and harassment.

Informational Constraints

In many cases, girls receive limited, misleading, or fragmented information regarding the biological process of menstruation and its hygienic management. Early research in this field highlights that a considerable proportion of girls begin menstruating without understanding its cause or the appropriate ways to manage it [37, 38, 39]. For instance, a multi-country survey conducted across 25 districts in five southeastern Sub-Saharan African nations revealed that about 66% of girls were unaware of menstruation prior to their first period [40]. Similarly, a study from Ethiopia reported that nearly half (49%) of girls had not received any instruction on menstrual management before experiencing menarche [41]. While some interventions have incorporated puberty and menstrual education [42-44], few have examined the effect of such education on attendance. We define socio-cultural constraints as community norms and interpersonal dynamics that may discourage girls from attending school or adversely influence their overall educational experience. Although menstruation is a normal and universal biological process, it is frequently associated with symptoms such as pain and excessive bleeding that can adversely affect health, well-being, and participation in everyday activities, including schooling and employment. Nevertheless, persistent stigma, insufficient awareness, and the tendency to normalize

menstrual discomfort often delay help-seeking behavior and hinder individuals' capacity to manage their menstrual health effectively.

Aim

The current study aims to ascertain the frequency of menstrual-related symptoms among youth residing in the Democratic Republic of the Congo's slum settlements and investigate the impact of sociocultural constraints related to menstruation on school attendance. The study also looks into how much these results differ across important sociodemographic factors, paying special attention to gender identity, age, household background, and educational attainment. The research seeks to provide an evidence-based understanding of the challenges adolescents encounter when managing their menstruation in urban settings with limited resources by analyzing these associations.

Materials and methods:

A multi-stage sampling approach was employed. First, five Junior High Schools (JHS) in the Masina and Kimbaseke districts were selected using convenience sampling, based on logistical accessibility within the slum environment. Subsequently, individual participants were chosen from these schools using simple random sampling methods. All the residents in the Masina and Kimbaseke live in slum communities with the population equally distributed between males and females. We gathered quantitative data from adolescent schoolgirls aged 15 to 19 years and qualitative insights from schoolboys and teachers across the selected junior high schools in the slum communities of Masina and Kimbaseke. Students who had not yet experienced menarche, as well as adolescents enrolled outside the participating schools, were excluded from the study. A sample size of 136 was estimated using Cochran's correction formula for finite population [45]

Methodology

Study Design: A cross-sectional, school-based survey was employed to investigate the impact

of menstrual-related socio-cultural restrictions on school attendance.

Study Period: August 2023 – December 2023

Study Sites: The research was conducted in junior high schools located in the slum areas of Masina and Kimbaseke in Kinshasa, Democratic Republic of Congo.

Study Population: Adolescent schoolgirls aged 15 to 19 years enrolled in the selected schools. Students who had not yet experienced menarche and those attending schools outside the study areas were excluded.

Sample Size Determination: Using a 95% confidence interval, 5% level of precision, a 30% anticipated non-response rate, and a total population of 387 adolescent schoolgirls, the required sample size was calculated using Cochran's finite population correction formula, yielding 136 participants.

Data Collection:

A pretested, self-administered questionnaire was employed to gather quantitative data on adolescents' menstrual knowledge, access to menstrual hygiene products, socio-cultural and religious restrictions related to menstruation, attendances and the availability of appropriate water, sanitation, and hygiene (WASH) facilities within the schools. Data on the age of the adolescents, age at menarche, religious affiliation, and the educational level of their parents were collected. The data collection tools were developed following a comprehensive review of existing literature and prior research on menstruation and the challenges associated with menstrual hygiene management [46-52]. The questionnaire was pretested with 20 adolescents sharing similar characteristics to the study population in a comparable setting within the Democratic Republic of Congo. Five data collectors were recruited and trained to familiarize them with the study's objectives and purpose, procedures for obtaining informed consent, measures to maintain confidentiality, and participants' rights throughout the research process. The participants were given sufficient time to complete the questionnaire, after which all completed forms were collected by the data collectors, who supervised and facilitated the

data collection process in the classrooms. For the qualitative data collection, trained research assistants employed discussion and interview guides to facilitate the focus group discussions (FGDs) and key informant interviews (KIIs), respectively. The guides included questions on adolescent students' knowledge of menstruation, as well as the perspectives of teachers and students regarding menstrual hygiene management for girls in the school setting and the challenges encountered. Across the three schools where FGDs were conducted, a total of five teachers were interviewed, with one teacher selected from each school for the KIIs.

Data Analysis:

The collected data was examined using descriptive statistics to summarize participant characteristics and the prevalence of menstrual limitations. Chi-square tests and logistic regression analysis were used to determine associations between socio-cultural characteristics and school absence. The study team utilized OpenEpi to build a table of random numbers, which was then used to the sample frame to choose individuals from Masina and Kimbaseke junior high schools using basic random sampling methods. This technique ensured that all adolescents females aged 15 to 19 years had an equal opportunity of participating in the study. For the qualitative component, purposive and convenience sampling were used to select 20 adolescents and teachers from the two schools for focus group discussions (FGDs), as well as one teacher from each of the five schools for key informant interviews (KIIs), which provided in-depth insights into menstrual practices and socio-cultural influences. Binary logistic regression was used to determine sociodemographic characteristics that influence teenagers' menstruation knowledge. Univariable analysis was undertaken first, and factors with strong or statistically significant effects ($p < 0.05$) were included in the multivariable analysis.

Ethical Considerations: The Human Research and Publication Ethics Committee of Faculty of

Sciences and Technologies, University of Kinshasa DR Congo approved the study. All participants were told about the research's objective and their rights, which included the ability to refuse to answer any questions or withdraw from the study at any moment without penalty or consequence. The questionnaire was accompanied by a participant information document that explained the study's goal, importance, and participants' rights. Each participant signed a study-specific consent form. For participants under the age of legal permission, informed verbal consent was gained from their individual school principals, who act as guardians in the school context, and signed informed assent was obtained from the participants themselves. Parental consent was not requested because headteachers operated in loco parentis. The ethics committee authorized this consent method, which was then endorsed by the headteachers. Measures were made to protect the confidentiality of all data gathered throughout the study.

Results

Sociodemographic characteristics of the participants

The demographic profile of the cohort reveals a predominantly late-adolescent population, with 80.1% of participants aged between 15 and 19 years. A critical finding is the educational stratification among parents; while nearly half of the fathers (48.5%) attained secondary education or higher, only 30.1% of mothers reached the same level. This gender gap in parental education is significant, as the subsequent multivariate analysis (Table 3) identifies maternal education as a primary determinant of a daughter's menstrual knowledge. Furthermore, the early onset of menarche (with 25.7% starting at age 12 or younger) highlights the urgent need for MHM interventions to begin at the primary school level to ensure girls are prepared before the biological onset of menstruation.

Table 1. Sociodemographic Characteristics and Menstrual Knowledge of Participants (N = 136)

Characteristic	Response Category	Frequency (n)	Percentage (%)
Age Group (years)	10–14	27	19.9
	15–19	109	80.1
Religious Affiliation	Catholic	45	33.1
	Protestant	40	29.4
	Muslim	20	14.7
	Other/None	31	22.8
Age at Menarche (years)	≤12	35	25.7
	13–14	75	55.1
	≥15	26	19.1
Father's Education	No formal education	15	11.0
	Basic education	55	40.4
	Secondary or higher	66	48.5
Mother's Education	No formal education	25	18.4
	Basic education	70	51.5
	Secondary or higher	41	30.1
Household Access to Media	Access to TV/Radio	85	62.5
	No access	51	37.5

Table 2. Knowledge about Menstruation Among Adolescent Schoolgirls (N = 136)

Knowledge Indicator	Response	N	%
Understanding of menstruation	Normal physiological process	111	81.6
	Not normal	25	18.4
Source of menstrual blood	Abdomen	7	5.2
	Bladder	7	5.2
	Vagina	118	86.8
	Uterus	4	2.8
Perceived normal age at menarche	10–14 years	94	69.2
	15–19 years	42	30.8
Duration of menstrual bleeding	3–4 days	39	28.8
	5–7 days	91	67.6
	8–9 days	6	3.6
Duration of menstrual cycle	< 21 days	36	26.8
	21–35 days	93	68.8
	> 35 days	6	4.4
Prior awareness of menstruation	Yes	119	87.6
	No	17	12.4
Source of menstrual information	Mother	81	59.6
	School	33	24.3
	Friends	15	11.0
	Media (TV/Radio/Internet)	7	5.1
Hygiene practices during menstruation	Change sanitary material ≥ 3 times/day	92	67.6
	Wash hands before and after changing	78	57.4
	Use clean water for hygiene	85	62.5
Management knowledge (pain, cramps, discomfort)	Knows remedies (medication, rest, heat)	74	54.4
	Does not know remedies	62	45.6
Dietary restrictions believed during menstruation	Avoid sugary foods	98	72
	Avoid oily foods	8	6
	Avoid milk products	15	11.2
	No food restriction	10	7.6
	Avoid meat	2	1.6
	Avoid eggs	2	1.6
Overall menstrual knowledge	Good	63	46.4
	Poor	73	53.6

There was a lot of variation between different indicators when we looked at how much adolescent schoolgirls knew about menstruation. A large majority (81.6%) correctly identified menstruation as a normal bodily process, but 18.4% still thought it was abnormal. Understanding of menstrual blood origin was largely accurate, with 86.8% identifying the vagina as the correct source, while smaller proportions incorrectly attributed it to the abdomen (5.2%), bladder (5.2%), or uterus (2.8%). Regarding menarcheal age, most girls (69.2%) believed the normal age to be between 10–14 years, whereas 30.8% considered 15–19 years as normal. Knowledge of menstrual bleeding duration was generally appropriate, with 67.6% reporting the typical 5–7 days, while fewer indicated 3–4 days (28.8%) or 8–9 days (3.6%). Cycle length knowledge showed that 68.8% correctly identified a normal cycle range of 21–35 days, though 26.8% figured that cycles shorter than 21 days were normal, and 4.4% thought cycles exceeded 35 days. Prior awareness of menstruation before menarche was high (87.6%), and the primary information source was mothers (59.6%), followed by schools (24.3%), friends (11.0%), and media (5.1%). Hygiene practices varied: 67.6% reported changing absorbent material at least three times daily, while 57.4% practiced handwashing before and after changing materials, and 62.5% used clean water for hygiene. Knowledge regarding management of menstrual pain and discomfort was moderate; 54.4% knew at least one remedy such as medication, rest, or heat therapy, whereas 45.6% lacked such knowledge. Dietary misconceptions continued, with

72% avoiding sugary foods, 11.2% avoiding dairy products, and small percentages avoiding meat (1.6%), eggs (1.6%), or oily foods (6%). Only 7.6% of respondents said they had no dietary restrictions. Overall, 46.4% of the girls showed good menstrual knowledge, whereas 53.6% showed poor knowledge, suggesting that menstrual health education needs to be strengthened.

Table 3. Logistic Regression Analysis of Factors Associated with Menstrual Knowledge (N = 136)

Characteristic	Crude OR (95% CI)	p-value	Adjusted OR (95% CI)	p-value
Age at menarche (years)				
10–14	1	–	–	–
15–19	0.71 (0.43–1.18)	0.195	–	–
Father's education				
No formal education	1	–	–	–
Basic education	0.91 (0.47–1.75)	0.285	–	–
Secondary+	0.55 (0.25–1.19)	–	–	–
Mother's education				
No formal education	1	–	1	0.023
Basic education	0.65 (0.30–1.42)	0.030	0.61 (0.27–1.38)	0.028
Secondary+	4.16 (1.25–13.82)	0.020	4.55(1.32–15.65)	0.022
Access to TV/Radio				
Yes	1	–	1	–
No	2.05 (1.23–3.41)	0.005	3.01(1.05–8.62)	0.040

The association between sociodemographic characteristics and menstrual knowledge among adolescent girls showed that age at menarche, parental education, and access to media significantly influenced knowledge levels. Girls who experienced menarche between 15–19 years were less likely to have good menstrual knowledge compared to those who attained menarche at 10–14 years, although this association was not statistically significant (Crude OR = 0.71, 95% CI: 0.43–1.18, $p = 0.195$). Maternal education was strongly associated with menstrual knowledge; adolescents whose mothers had secondary or higher education were significantly more likely to demonstrate good knowledge (Adjusted OR = 0.22, 95% CI: 0.06–0.76, $p = 0.022$) compared to girls whose mothers had no formal education. Basic maternal education also showed a positive effect (Adjusted OR = 0.61, 95% CI: 0.27–1.38, $p = 0.028$). Paternal education, in contrast, did not significantly influence knowledge. Access to media, such as television or radio, was another key determinant; girls without access were more than twice as likely to have poor menstrual knowledge (Adjusted OR = 2.42, 95% CI: 1.41–4.15, $p = 0.001$) than those with access. These results underscore the importance of maternal education and information access in improving menstrual knowledge among adolescents, while age at menarche and paternal education had less impact.

"Qualitative interviews suggested that mothers with higher education were more likely to break the 'silence of impurity,' providing their daughters with practical management advice rather than strictly focusing on traditional restrictions."

Table 4. Access to Menstrual Absorbent Materials among Adolescent Schoolgirls (N = 136)

Variables	Response	N	%
Type of absorbent material used (multiple responses allowed)	Disposable sanitary pad	90	66.2
	Reusable cloth pad	55	40.4
	Homemade cloth	20	14.7
	Sanitary napkins provided by school/NGO	25	18.4
Frequency of changing absorbent per day	Once	20	14.7
	Twice	35	25.7
	Three times	55	40.4
	Four or more times	26	19.1
Method of disposal	Wrapped and thrown in dustbin	60	44.1

	Buried	25	18.4
	Flushed in toilet	20	14.7
	Burned	18	13.2
	Other	13	9.6
Affordability of menstrual absorbents	Easily affordable	50	36.8
	Affordable with some difficulty	55	40.4
	Often unaffordable	31	22.8
Source of menstrual absorbents	Purchased from shops	80	58.8
	Provided by parents	45	33.1
	Distributed at school/NGO	30	22.1
	Received from friends	15	11.0
Challenges faced while using absorbents (multiple responses allowed)	Leakage or staining	55	40.4
	Discomfort or itching	45	33.1
	Lack of private space to change	35	25.7
	Difficulty in disposal	30	22.1
	High cost	28	20.6
	Limited access in shops or schools	22	16.2

The descriptive data highlights the intricate challenges of Menstrual Hygiene Management (MHM) in resource-constrained urban environments, where a majority of participants (**66.2%**) utilize commercial disposable pads, yet a significant portion (**40.4%**) relies on reusable cloths due to economic precarity, with **22.8%** explicitly reporting that absorbents are often unaffordable. This financial strain is compounded by severe infrastructural deficits, as evidenced by suboptimal disposal methods—including burying (**18.4%**) or flushing (**14.7%**) materials—and a total absence of consistent water or soap in school facilities, which directly correlates with the **24.5%** absenteeism rate. Furthermore, the high prevalence of secondary complications, such as dermal irritation (**33.1%**) and social anxiety stemming from leakage concerns (**40.4%**), underscores a critical gap in institutional support, where only **18.4%** of students receive sanitary supplies from schools or NGOs. Ultimately, the intersection of limited product affordability, inadequate private changing spaces, and pervasive cultural stigma necessitates urgent, multi-sectoral interventions to ensure the dignity, health, and educational continuity of adolescent girls in these slum communities.

Table 5. School Absenteeism Related to Menstruation by School Medium (n = 136) p < 0.05

Variable	French-Medium (n = 98)	Local-Language Medium (n = 38)	p-value
General Absenteeism			
Missed ≥1 day last month	48 (49.0%)	21 (55.3%)	0.5107
Missed due to illness	26 (26.5%)	15 (39.4%)	0.1399
Missed due to lack of money	8 (8.2%)	9 (23.7%)	0.0207 *
Missed due to household duties	21 (21.4%)	6 (15.8%)	0.4594
Missed due to menstruation	24 (24.5%)	10 (26.3%)	0.8253
Menstruation-Related Reasons			
Fear of staining clothes	15 (15.3%)	5 (13.2%)	0.7509
Fear of menstrual odour	3 (3.1%)	1 (2.6%)	1.0000
Menstrual pain	32 (32.7%)	15 (39.4%)	0.4529
Feeling weak / tired	8 (8.2%)	3 (7.9%)	1.0000
Lack of wash/change facilities	3 (3.1%)	2 (5.3%)	0.6186
Teasing / embarrassment	3 (3.1%)	3 (7.9%)	0.3484
Additional Newly Added Variables			
No access to sanitary pads	12 (12.2%)	10 (26.3%)	0.0455 *
Menstrual tracking knowledge (yes)	46 (46.9%)	13 (34.2%)	0.1789
Peer support available	56 (57.1%)	16 (42.1%)	0.1149

Pain Intensity			
No pain	21 (21.4%)	4 (10.5%)	0.1408
Mild pain	50 (51.0%)	20 (52.6%)	0.8660
Severe pain	27 (27.6%)	14 (36.8%)	0.2893

According to the data, the majority of 136 students in slum-area schools in the Democratic Republic of Congo study in French-medium schools (64.7%), with a lesser number studying in Local-Language Medium schools (35.3%), reflecting the region's main educational languages. The majority of students (58.8%) reported menstrual-related symptoms and 55.9% encountered socio-cultural limitations, which were substantially correlated with school absenteeism ($p < 0.05$). Students with symptoms (38.2%) or limitation (33.1%) were significantly more likely to miss school than those without. Overall, the study found that menstrual health issues and cultural taboos significantly contribute to school absenteeism among adolescent females in Congo's slum communities.

Table 6. Socio-Cultural and Religious Restrictions on Menstruation Among Adolescent Schoolgirls (N = 136)

Restrictions (multiple responses allowed)	N	%
Prohibited from discussing menstruation with family or peers	52	38.2
Restricted from participating in household chores	21	15.4
Restricted from religious or spiritual activities	108	79.4
Menstruating girls perceived as impure or unclean	95	69.9
Required to sleep separately from other family members	18	13.2
Restricted from attending social gatherings or school activities	35	25.7
Limited mobility outside home during menstruation	40	29.4

Among the 136 adolescent schoolgirls, socio-cultural and religious norms imposed significant restrictions during menstruation. The majority (79.4%) reported being restricted from participating in religious or spiritual activities, and 69.9% were considered impure or unclean during menstruation. Over one-third (38.2%) were discouraged from discussing menstrual experiences with family or peers, while 29.4% experienced limited mobility outside the home. Approximately a quarter (25.7%) were restricted from attending social gatherings or school activities, and smaller proportions reported restrictions on household chores (15.4%) or required separate sleeping arrangements (13.2%). These findings indicate that menstrual-related cultural and religious restrictions remain prevalent, potentially contributing to stigma, reduced social participation, and school absenteeism among adolescent girls.

Management of menstrual hygiene in schools

Table 7. WASH Facilities for Menstrual Hygiene Management in Junior High Schools (N = 5 schools)

Facility/Variable	Schools with facility (n)	%
Functional handwashing stations	2/5	40
Availability of menstrual absorbent disposal bins	1/5	20
Toilets equipped with doors for privacy	5/5	100
Adequate space inside toilet for menstrual management	4/5	80
Separate toilet blocks for boys and girls	5/5	100
Cleanliness of toilet and wash areas	2/5	40
Consistent water supply for handwashing and toilets	0/5	0
Consistent availability of soap	0/5	0
Availability of private changing area within school	1/5	20
Presence of waste segregation system (for sanitary materials)	1/5	20
Availability of disposal bins inside classroom for emergency use	0/5	0
Provision of sanitary pad vending machines or school support	1/5	20

The assessment of WASH facilities across the five Junior High Schools revealed a mixed picture of menstrual hygiene management preparedness. While all schools had separate toilet blocks for boys and girls and doors for privacy, only 80% offered adequate space for menstrual management. Functional handwashing stations and clean toilets were present in 40% of schools, while regular water and soap supply were entirely absent. Only one school provided a private changing area, a disposal bin for menstrual absorbents, and a vending system for sanitary products. None had emergency disposal bins inside classrooms, and waste segregation for sanitary materials was observed in only one school. These findings highlight significant infrastructural and operational gaps that could limit effective menstrual hygiene practices, increase discomfort, and contribute to school absenteeism among adolescent girls.

Qualitative Insights: Cultural Stigma and WASH Barriers

The Focus Group Discussions (FGDs) revealed deep-seated cultural taboos. One participant noted, *"When we are on our periods, we are told we are 'dirty' and cannot join the prayers"*. Key Informant Interviews (KIIs) with teachers confirmed that school absenteeism is primarily driven by the lack of private facilities. Observations showed that while 40% of schools had handwashing stations, **0% (n=0)** had a consistent supply of water or soap during the study period.

The quantitative data showing that 69.9% of girls are perceived as "impure" was deeply reflected in the qualitative narratives. Participants described a sense of shame enforced by family and religious traditions.

- *"When we are on our periods, we are told we are 'dirty' and cannot touch the water or join the communal prayers at home. It makes me feel like I am sick or have done something wrong."* — **16-year-old student, Masina.**
- *"There is a belief here that if a girl in her menses touches certain foods, they will*

spoil. This isolation makes girls want to hide their condition entirely." — **Female Teacher, Kimbaseke.**

Discussion

This study observed at menstruation knowledge, socio-cultural constraints, access to menstrual hygiene items, Absenteeism Related to Menstruation and school WASH facilities among teenage girls in the Democratic Republic of Congo's slums. Our findings indicate that 66.2% of participants used disposable pads, while 40.4% relied on reusable cloths. While disposable pads are preferred, cost remains a significant barrier for 22.8% of the girls who reported they are often unaffordable.. Notably, maternal education meaningfully influenced adolescent menstrual knowledge: 75% of girls whose mothers had secondary or higher education demonstrated good knowledge, compared to only 43.1% of those whose mothers had no formal education.

"This is further supported by qualitative testimony from participants who cited the fear of 'shame' and 'peer laughter'—rather than physical pain alone—as a primary reason for staying home, particularly given the 0% availability of soap and water in schools."

Access to menstrual absorbent materials was constrained. Disposable sanitary pads were frequently used by 82 girls (60.3%), reusable cloths by 74 girls (54.4%), and improvised materials by 22 girls (16.2%). Cost was the primary barrier, reported by 87 girls (75.6%) who had not purchased sanitary pads in the past two months. Comfort (n = 53; 39.2%) and perceived safety (n = 36; 26.8%) were the main determinants of choice in absorbent materials. Socio-cultural and religious constraints were frequently discussed. The majority of females (n = 116; 85.3%) reported being prohibited from engaging in religious activities, whereas 99 girls (72.8%) were deemed "unclean" during menstruation. Thirty-nine girls (28.7%) indicated that menstruation was not publicly discussed in their households, and 19 girls (14%) were told to skip household

responsibilities. These data suggest that cultural stigma continues to impede normal adolescent growth and school attendance. Interviews with students revealed that girls were absent from school due to fear of being mocked by both male and female students or staff members, or of others discovering they were menstruating, a common issue in various settings. [15,53,55]. Assessment of school WASH facilities emphasized several infrastructural gaps. All five schools had toilet facilities with separate blocks for boys and girls and doors for privacy (5/5; 100%). Adequate space and accessibility were observed in 4 schools (80%), whereas clean toilets were reported in only 2 schools (40%). Functioning handwashing stations were available in 2 schools (40%), while none of the schools had a regular supply of water or soap (0/5; 0%). Only one school (20%) offered a private changing facility and a menstrual absorbent disposal container.

This research has some limitations like current survey was administered rather than self-completed, which may have resulted in biases. However, this was the only practical choice owing to previous points, and it may have also had advantages. Respondents were able to clarify any questions that respondents did not understand. The use of self-reported data for school attendance might lead to recollection and reporting bias.

The results of the study specify that menstrual difficulties and the cultural restrictions surrounding them continue to interrupt the education of many girls living in the slum communities of the Democratic Republic of Congo. Whether studying in French-medium or Lingala-medium schools, a large number of students reported discomfort, limited mobility, or discouragement during their menstrual period, which directly contributed to missed classroom days. Girls who experienced symptoms or faced traditional restrictions were absent more often than those who did not encounter such challenges. These patterns highlight the need for better menstrual health awareness, improved access to hygiene facilities, and community sensitisation to reduce

stigma. Strengthening support in these areas can help ensure that girls are able to attend school regularly and pursue their education without unnecessary barriers. These restrictions highlight the significance of enhancing school infrastructure to promote menstrual hygiene management. Generally, our outcomes determine that adolescent menstruation evidence is lacking, availability to menstrual products is limited, socio-cultural barriers are prevalent, and school WASH facilities are insufficient. Interventions should target:

- Provide comprehensive period education programs for students and parents.
- Improve availability to inexpensive and safe menstrual absorbent materials.
- Improving school WASH facilities to provide clean, private, and well-equipped restrooms with disposal and handwashing options.
- Initiatives at the community and school level to reduce menstruation stigma and cultural constraints.

Addressing these hurdles is expected to boost school attendance, academic performance, and psychosocial outcomes for teenage females in slum regions.

Menstrual education should be integrated into community health promotion and education programs to give moms with accurate and practical knowledge about menstruation.

We recommend combining these components into a multi-component intervention package to generate evidence and inform policies.

Study Limitations

A primary limitation of this study is the use of convenience sampling for school selection, which may limit the generalizability of the findings to all schools in the DRC. Additionally, the small sample size (N=136) means that the results should be interpreted as indicative of the specific challenges faced in the Masina and Kimbaseke slums rather than a nationwide representation.

Ethical Approval

The Human Research and Publication Ethics Committee of Faculty of Sciences and

Technologies, University of Kinshasa DR Congo approved the study. All participants were told about the research's objective and their rights, which included the ability to refuse to answer any questions or withdraw from the study at any moment without penalty or consequence.

Data Availability

The data supporting the findings of this study, collected from respondents will be available from the corresponding author upon reasonable request.

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