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Original Research Article

Impact of dysmenorrhea on urban school girls in Tanzania: the need for a comprehensive menstrual health management guideline

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ABSTRACT

Background: Menstrual health management is poorly understood by school girls in most low-income countries. Water, sanitation, and hygiene facilities are essential for the proper management of menstruation. Dysmenorrhea should also be considered. The current study investigated knowledge of menstrual hygiene and the prevalence of dysmenorrhea among school girls in a city in Southern Highland Tanzania.
Methods: A cross-sectional study was conducted in Mbeya city in the southern highlands of Tanzania. 292 high school girls were randomly selected from three schools. Data were collected using a pre-tested structured questionnaire. The data were initially entered into the computer using Epi-info version 3.5.1 and later exported to SPSS for Windows version 20.0 for analysis. Multivariate analyses were performed with a 95% confidence interval. The significance level was set at $p \leq 0.05$.
Results: The mean age of the participants was 18.02±1.34 years. 68.49% had a good knowledge of menstrual hygiene (mean knowledge level; 64.64±9.13%) and 91.78% had good menstrual hygiene practices (mean score; 89.32±13.7%). Delayed age of menarche and years of menstruation were associated with good menstrual practices, OR; 3.94, 95% CI 1.49-10.72, $p=0.006$. 56.5% reported having moderate to severe menstrual pain.
Conclusions: Most participants had good knowledge and practice of menstrual hygiene, however, the level of knowledge was lower than practice. The majority suffer from unbearable menstrual cramps that adversely affect their studies. There is an urgent need for a comprehensive guideline for menstrual health management in schools that takes into account knowledge, practice, and pain management.

Keywords: Dysmenorrhea, Guideline, Menstrual health management

INTRODUCTION

Menstruation is the result of a series of physiological changes in hormone production and secretion that affect the function of the uterus and ovaries in the female reproductive system. The widely accepted age range for menarche (the onset of menstruation) is between 10 and 15 years, with an average age of 12.4 years.[1] If menarche occurs before the age of 10, it is considered early and if it occurs after the age of 15, it is considered late.[2] Adolescent menstrual cycles vary from population to population and become more regular with each gynecological year.[3] Nearly 800 million women menstruate on any given day and about 500 million lack access to adequate information on good practices, a supportive environment, and affordable and appropriate menstrual hygiene materials to effectively manage their menstruation. In low- and middle-income countries in particular, lack of appropriate private environments such as changing rooms, inadequate water, sanitation, and hygiene (WASH) facilities, and lack of access to

affordable menstrual hygiene products are a major obstacle for adolescent girls going to school, severely affecting their menstrual hygiene management (MHM) practices and their ability to learn.[4]

In low- and middle-income countries, the most significant factor is the absence of sufficient information regarding menstruation hygiene. Research carried out in certain regions of Africa revealed that as many as 68% of participants lacked an adequate understanding of menstruation, and 60% practiced inadequate menstrual hygiene.[5,6] In poor socioeconomic areas, menstruating teenage girls leave school due to a lack of inexpensive menstrual health management resources and an unfavorable environment.

According to reports from Uganda, 43% of schoolgirls are dissatisfied with the changing rooms that are accessible for them when menstruating.[7] Likewise, in Kenya, only 32 percent of the schoolgirls surveyed expressed satisfaction with the private area provided at their schools for changing pads or pants.[8] The shared latrines with boys, latrine doors not being locked, the scarcity of water and other supplies for sanitation, such as soap, and the absence of pad disposal facilities are the related hindering factors mentioned. Due to similar factors, 62% (n=140) and 17% (n=1346) of the schoolgirls questioned in Tanzania and Uganda respectively, said they missed class when they were menstruating.[9,10]

The International Fund for Africa (IFA) initiated the School Menstrual, Hygiene and Management Project (SMHMP) in African schools in 2015 under the WASH program to benefit 1,500 pubescent schoolgirls annually in Eastern and Southern Africa. The project's main objectives were to enhance MHM practices, decrease menstruation-related absenteeism, and boost academic performance. However, the success of the project has been met with skepticism in some areas, and crucial factors contributing to absenteeism during menstruation may have been neglected. Recent studies conducted in sub-Saharan Africa revealed that a significant number of adolescent school girls, up to 84%, suffer from dysmenorrhea, also known as painful menstruation.[11,12] In these reports rate of proper menstrual hygiene practices was found to be as low as 45%.

In Tanzania, a significant number of schoolgirls, (75% of the interviewed participants), reported experiencing dysmenorrhea in 2022, with 42% of them suffering from intense pain that resulted in missing school, inattentiveness in class, and mediocre academic achievement.[13,14] First-line medication for pain relief is not commonly provided to menstruating teenage schoolgirls in Africa, despite the significant occurrence of moderate to severe dysmenorrhea.[13,15,16]

Furthermore, a comprehensive survey carried out by Tanzania's National Institute for Medical Research (NIMR) highlighted that 42% of school girls lack access to appropriate menstrual products, and 34% face challenges in finding changing rooms and clean toilets.[10] To accelerate the development of an inclusive menstrual health management strategy, an assessment of the present state of knowledge and behaviors on menstrual hygiene including pain management, among adolescent schoolgirls in the region is necessary.

METHODS

Study design

A school-based cross-sectional study design was employed in Mbeya City in Southern Highland Tanzania. A multi-stage sampling technique was used to select high school girls from three schools. Data collection was carried out from May 3, 2023, to July 30, 2023, using a pre-tested structured questionnaire.

Inclusion criteria

All post-menarche secondary school girls aged 10 to 20 who were enrolled in the three randomly selected government schools and gave their agreement were eligible to take part in the study.

Sample size

In this study, a total of 292 eligible adolescent schoolgirls were involved, with the sample size calculated using Fisher's formula $N= (Z^2 \times P(1-P))/e^2$. Here, N denotes the minimum sample size, P stands for the prevalence of adolescent girls with good knowledge and practice on menstrual hygiene (reported as 25%, [17], Z represents the Normal standard deviation at a 95% confidence interval (1.96), and e indicates the Standard maximum error (0.05).

Statistical analysis

Data entry into a computer was performed using Epi-info version 3.5.1, followed by exportation of the data to SPSS for Windows version 20.0 for analysis. Logistic regression analyses were conducted at a 95% confidence interval to assess the relationship between independent variables (age at menarche, class level, years of menstruation) and dependent variables (knowledge and practices) along with their significance levels. Statistical significance was established at $p \leq 0.05$.

RESULTS

Socio-demographic characteristics of participants

A total of 292 school girls took part in the study, with a 100% response rate for all questions. The study included 83 girls from School A, 100 girls from School B, and 109 girls from School C. The largest portion of participants, accounting for 69.18% (n=202), fell within the age range

of 18 to 20 years. The average age of the participants was 18.02±1.34 years, Table 1.

Table 1: Socio-demographic characteristics of the participants.

Age group (years)	Frequency (N)	Proportion (%)
12 - 17	83	28.42
18 - 20	202	69.18
21- 24	7	2.4
Class level		
Form two	1	0.34
Form three	23	7.88
Form four	28	9.59
Form five	75	25.68
Form six	165	56.51

Gynecologic history

The data indicated that 73.97% (n= 216) of the participants reached menarche between the ages of 13 and 15, with an average age of 14.21 years. Most participants had menstrual cycles lasting 28 to 35 days, while 106 girls (36.3%) were unsure of the length of their cycles. Nearly all, 98.97% (n=289), reported a menstrual flow lasting 3 to 7 days. Regarding menstrual flow patterns, 43.15% (n=132) reported regular periods, while 45.21% (n=126) reported irregular periods.

Additionally, 66.1% of the participants experienced menstrual pain, with 9.6% (n=28) reporting mild pain, 34.9% (n=102) reporting moderate pain, and 21.6% (n=63) reporting severe pain, Table 2.

Table 2: Gynecologic features of the participants.

Gynecologic features	Frequency (N)	Proportion (%)
Age at menarche (years)		
10-12	29	9.93
13-15	216	73.97
16-18	47	16.1
Cycle regularity		
Yes	126	43.2
No	132	45.2
Don't know	34	11.6
Severity of dysmenorrhea		
No pain	99	33.9
Mild	28	9.6
Moderate	102	34.9
Severe	63	21.6

Knowledge of menstrual hygiene

The participants' understanding of menstrual hygiene was assessed. Out of the respondents, 283 individuals (96.92%) acknowledged that menstruation is a natural bodily process. Approximately half of the participants, 51.7% (n=151), stated that sanitary pads should be changed every four hours. This trend was more prevalent among senior schoolgirls, with 52.7% ($\chi 2=38.54$, $p=0.008$) citing this recommendation. Moreover, 68.6% of the participants (n=200) achieved a score above 75% and were categorized as having a good knowledge of menstrual hygiene. The average knowledge score was 64.64±9.13%. A summary of the specific questions and corresponding responses can be found in Table 3.

Table 3: Summarized questions and responses on knowledge of menstrual hygiene.

Question	Response	Frequency (N)	Proportion (%)
What is menstruation?	Is a physiological process	283	96.92
	It is a curse from God	1	0.34
	It is a disease	8	2.74
What causes menses?	Hormonal changes	276	94.52
	I don't know	16	5.48
What should you use when in the menstrual cycle?	Sanitary pad	271	92.81
	Piece of cloth	31	10.62
	Use nothing	0	0
	I don't know	1	0.34
How often should you change your sanitary pad/clothes?	Daily	2	0.68
	Every 2 hours	34	11.64
	Every 4 hours	151	51.71
	Every 6 hours	68	23.29
	Every 8 hours	34	11.69
	I don't know	3	1.03
Why should you use sanitary pads?	I don't know	3	1.03
	To avoid showering often	1	0.34
	To manage blood flow and	285	97.60

Continued.

Question	Response	Frequency (N)	Proportion (%)
	manage hygiene		
	To relieve menstrual pain	3	1.03
How should a sanitary pad be disposed of?	Burned	248	84.93
	Buried	7	2.40
	Thrown away	1	0.34
	Flashed in the toilet	21	7.19
	Discarded in the dustbin	11	3.77
	I don't know	8	2.74

Practice of menstrual hygiene

The participants' practices on menstrual hygiene were investigated. Responding to the questions, the majority of the girls, 257 (88.01%) reported using commercially available sanitary pads. 43 girls (14.04%) reported using reusable sanitary pads while 7 girls, (2.40%) used a piece of cloth. 66.78% (n=195) indicated to change pads at least three times a day. Again this practice was reported mainly by the senior high school (Forms Five and Six) students as compared to junior high school girls, ($\chi 2 = 39.83$, p-value = 0.001). Further, 73.36% (n=212) reported taking a bath at least twice a day when menstruating, 69.86% (n=204) indicated changing their underwear when changing sanitary pads and about 2.4% (n=7) did not change pads at all during the day. As well, almost all, 94.86%, (n=277) participants washed and exposed their used menstrual underwear to the sun and washed genitalia during every visit to the toilet. The specific questions and responses are summarized in Table 4.

Table 4: Summarized questions and responses on menstrual hygiene practices.

Question	Response	Frequency (N)	Proportion (%)
How often do you bathe in a day when in menstruation?	Once	16	5.54
	Twice	212	73.36
	Three times	57	19.72
	> Three times	4	1.39
How often do you change your underwear in a day?	After every toilet visit	10	3.42
	Once in a day	71	24.32
	I don't change	7	2.40
	Whenever changing sanitary pad	204	69.86
How do you take care of the underwear used in menstruation?	Hide and discard	2	0.68
	Wash and expose to sun	277	94.86
	Wash and hide	13	4.45
Do you wash your hands after changing a pad?	No	63	21.58
	Yes	229	78.42
Do you clean your genitalia after every toilet visit during menstruation?	No	18	6.16
	Yes	274	93.84

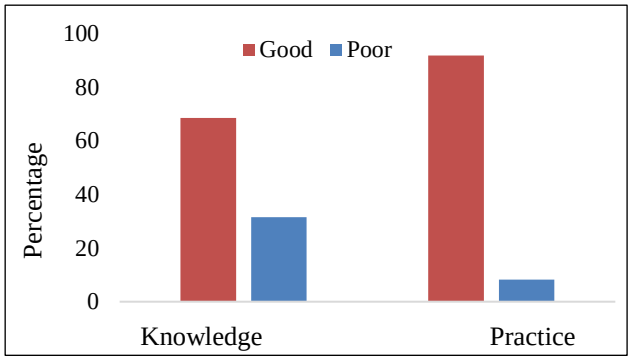

Figure 1: Knowledge and practice of menstrual hygiene levels among the participants.

The overall average score for menstrual hygiene practices was recorded as 89.32±13.7%. Moreover, a significant majority of 91.78% of the respondents obtained a score higher than 75% on the menstrual hygiene practice questions, signifying their adherence to commendable menstrual hygiene practices (Figure 1).

Analysis of the independent variables including good knowledge, age, age at menarche, and years of menstruation in relation to the dependent variable 'good menstrual hygiene practice' demonstrated a significant correlation with delayed age of menarche (older than 13 years) being strongly associated with good menstrual

hygiene practice (OR = 3.98, 95% C.I: 1.48-10.72, *p*= 0.006), (Table 5).

Table 5: Multivariate analysis of the variables against good menstrual hygiene practice.

Variable	N (%)	OR	95 % C.I		p-value
Good knowledge	200 (68.49)	2.44	0.81	7	0.112
Age group (years)					
12-17	83 (28.42)	1			
18-20	202 (69.18)	1.24	0.51	3.02	0.636
21-24	7 (2.4)	1			
Age at Menarche (Years)					
10-12	29 (9.93)	1			
13-15	216 (73.97)	3.98	1.48	10.72	0.006
16-18	47 (16.10)	14.63	169	126.41	0.015
Years of menstruation					
Below 1 year	4 (1.37%)	1			
1-5 years	243 (83.22)	2.45	0.95	6.30	0.063
6 to 10 years	45 (15.41)	1			

DISCUSSION

The study aimed to assess the understanding and behaviors surrounding menstrual hygiene management among high school girls in Mbeya City, Southern Highland Tanzania. Overall, most girls exhibited a commendable level of knowledge and adherence to menstrual health management practices. The percentage of knowledge and practice in relation to menstrual hygiene was recorded at 68.49% and 91.78%, respectively. Notably, the age at which menarche commenced and the number of menstrual years were identified as significant indicators of the effective practice of menstrual hygiene management. It was also found in this study that 66.1% of the participants experienced dysmenorrhea, and among them, 56.5% reported experiencing moderate to severe menstrual-related pains. These findings are consistent with the extensive NIMR report, which highlighted a mean knowledge score of 64.9% regarding menstrual hygiene management.[10] Similarly, in that report, 74% of the interviewed girls cited menstrual-related pain and discomfort as a cause for missing classes. Another study also conducted in Tanzania reported a dysmenorrhea prevalence of 75% among school girls, with 42% of them reporting severe pain.[13] In general, 61-84% of menstruating schoolgirls in sub-Saharan Africa experience dysmenorrhea, and 33%-56% of them suffer from severe pain.[18-21]

Reports from urban areas in Africa indicate a significant level of knowledge and practice regarding menstrual hygiene. However, it is important to acknowledge that girls in rural areas may face marginalization in this regard. Studies conducted in rural parts of Asia and Africa have revealed that knowledge and practice levels among rural adolescent girls can be as low as 40%.[12,22] It is worth noting that approximately 70% of the population in low- and middle-income countries resides in rural areas. Additionally, while a considerable percentage of menstruating adolescent girls in Africa use analgesics to alleviate menstrual-related pain, there is currently no standardized guideline for menstrual hygiene management that also addresses pain management.[13,16,19] Dysmenorrhea, among other issues, contributes significantly to menstruation-related absenteeism among school girls in low- and middle-income countries, necessitating urgent intervention.

This study has few limitations. Although dysmenorrhoea was cited as affecting students' studies, academic performance was not compared between those who had dysmenorrhoea and those who did not. It was also difficult to establish the direct link between dysmenorrhoea and academic performance as several other factors for poor academic progress should be ruled out.

CONCLUSION

In conclusion, the results of the current study affirm that the majority of teenage girls in Tanzania possess a satisfactory level of knowledge and adhere to acceptable menstrual hygiene practices. It is important to highlight that dysmenorrhea significantly contributes to school absenteeism, thereby adversely affecting the academic progress of schoolgirls. Consequently, there is a pressing need for a comprehensive guideline on menstrual health management specifically tailored for school girls. This guideline should encompass various aspects, such as knowledge enhancement, practice improvement, and effective pain management.

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