Knowledge and menstrual hygiene practices among adolescents in senior secondary schools in Ile Ife, south-western Nigeria

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ABSTRACT

A culture of silence surrounds menstruation while inadequate facilities predispose adolescents to psycho-social trauma and cyclic absenteeism from schools. This study assessed the knowledge and menstrual hygiene management (MHM) practices among in-school adolescents in an urban city in Nigeria. The descriptive, cross-sectional study identified 400 respondents through a multistage technique and collected data through validated questionnaire and observational checklist. The mean age and age-at-menarche of respondents were 15.3 ± 1.5 and 12.8 years, respectively. Most respondents (70%) were aged 10–15 years, had good knowledge of MHM (296, 74%) and knew about menstruation before menarche (85.4%). MHM knowledge was significantly associated with: mother's education ($p = 0.029$); absorbents changing frequency ($p = 0.003$); and age-at-menarche ($p = 001$). The number of absorbents used daily was 2.5 ± 0.7; 90% of adolescents changed absorbents at least twice daily while 24.2% had previously changed it in school. Moreover, 14.4% of respondents abstained from school during menstruation and there was a significant association between school type and menstrual absorbents used ($p = 0.0001$), mothers' education ($p = 0.0001$) and disposal of used absorbents ($p = 0.004$). Spent absorbents were mostly disposed of in pit latrines (35.1%) and by burning (32.6%). A wide disparity remains between good MHM knowledge and poor practices. Therefore, gender-friendly facilities should be provided in schools to ensure retention of girls and end psycho-social trauma experienced during menstruation.

Key words | gender-friendly MHM facilities, in-school adolescents, menarche, menstrual hygiene, Nigeria

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INTRODUCTION

Globally, about 52% of the female population are at reproductive age and commence menstruation between the ages of 10 and 19 (WHO 1996; Zegeye *et al.* 2009). Menarche is the onset of first menstruation experience and adolescence is marked by menarche that transits girls into adulthood (Jogdand & Yerpude 2011; Sumpter & Torondel 2013). Menarche varies according to geographical locations, racial factors, nutritional standards, environmental influences and indulgence in strenuous physical activities (WaterAid 2009). Menstruation is a normal physiological process during the females' reproductive ages of monthly shedding of the endometrial lining in menstrual fluid, which exits the uterus through the cervical opening and the body through the vagina (Aniebue *et al.* 2009). Menstruation knowledge is the art of understanding the female physiology and processes that result in the monthly menses. Menstruation is managed differently according to social and cultural understandings (Ali & Rizvi 2010).

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The menstrual cycle averages about 28 days, though ranges between 21 and 35 days in some females. The menstrual period lasts from 2 to 7 days, but most females experience menstrual flow for 3–5 days. However, the duration and intensity of menstrual flow varies between individuals and at different times in their lives (Adhikari *et al*. 2007; Ali & Rizvi 2010; House *et al*. 2012). Menstruation ceases temporarily during pregnancy and lactation, and ends at menopause (Thomas *et al*. 2001; Ali & Rizvi 2010).

Menstrual-hygiene management (MHM) engenders the holistic: (i) articulation, awareness, information and confidence to manage menstruation through sanitary menstrual absorbents; together with (ii) adequate water and gender-friendly washing and bathing facilities; and (iii) sanitary disposal of menstrual absorbents with privacy and dignity (Patkar 2013). Menstruation is associated with cultural beliefs and special practices, depending on existing socio-cultural and economic contexts (Aubeny 2007; Ali & Rizvi 2010; Oche *et al*. 2012). Some of these perceive menstruating females as unclean, restricting and isolating them from prayers and social functions.

Globally, females are vulnerable to gynaecological and urinary tract infections during menstruation due to higher vaginal pH, dilated cervical opening, lower cervix and absence of the endometrial lining (Adhikari *et al*. 2007). The situation is aggravated by poor personal hygiene/MHM systems and use of unsanitary menstrual absorbents (UMA). Ideally, females should have sanitary materials in their lockers and gender-friendly facilities in schools (El-Gilany *et al*. 2005).

Previous studies revealed ignorance about the menstruation process and safe practices (Suneela *et al*. 2001; Lawan *et al*. 2010; George 2012). Also, Ahuja & Tiwari (1995) revealed that about three-quarters of girls were ignorant about the physiology of menstruation and experienced isolation during menstruation while Abioye-Kuteyi (2000) revealed that poor awareness, cultural beliefs, poverty and lack of privacy lead to poor menstrual practices in Nigeria.

Therefore, attention should be directed at MHM since most in-school adolescents experience menarche in secondary schools. The study therefore assessed the knowledge and menstrual hygiene practices among adolescents in schools towards engendering safe MHM.

MATERIALS AND METHODS

Study location

Ile Ife is the oldest town of the Yoruba people in south-western Nigeria with a land area of 283 km^2 (Figure 1). It has a population of 355,818 people, comprising 183,509 (51.6%) males and 172,309 (48.4%) females (NPC 2009). The study was conducted in public and private secondary schools in the urban area where there were 48 public and 38 licensed private secondary schools, respectively.

Study design

The study utilised a descriptive cross-sectional design. The sampling frame comprises in-school females of all senior secondary schools (SSS) at Ile Ife while those in the randomly selected schools were the study population.

Sample size determination

The sample size was determined by Fisher's formula for estimating single proportions (Naing *et al*. 2006), with standard normal deviate at 95% confidence level and 40% crude estimate of true proportion deficient in menstrual hygiene knowledge among school girls in Nigeria (Aniebue *et al*. 2009). The margin of error was 5%, giving a minimum number of respondents of 369, increased to 406 for robustness of analysis and attrition.

Sampling technique

Respondents were selected by multi-stage sampling technique.

1. The 88 secondary schools in Ile Ife were stratified into public (48) and private (38) schools.
2. The private secondary schools has junior and senior classes, while in public secondary schools, there were separate junior (24) and SSS (24), respectively. Hence, public schools were subdivided into junior and SSS.
3. Two SSS each were randomly selected through balloting from the list of private and public SSS, respectively.

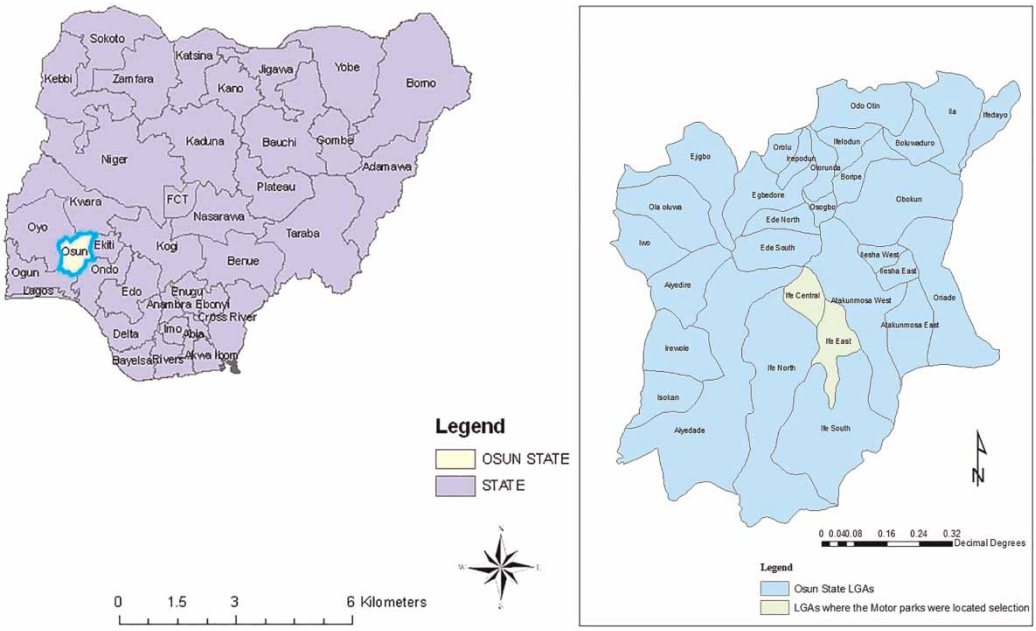

Figure 1 | Map of Nigeria showing Osun State and the study area.

4. Females of the selected schools were stratified into pre- and post-menarche students.
5. Proportional to size technique was utilised to allocate the number of respondents in each school while random sampling was used to identify respondents among the eligible population, adding up to 406 respondents respectively.

Inclusion criterion

Participation in the study was limited to adolescents aged between 10 and 19 years in randomly selected schools.

Data collection and analysis

The study was conducted between January and March, 2013. The study instruments were self-administered, semi-structured questionnaire and observational checklist. For content validity, they were pre-tested and used to obtain information from respondents. The instruments had sections on socio-demography; knowledge, attitude and MHM practices; type and status of menstruation support facilities in schools. The data was analysed by SPSS, version 16.0. The mean, frequency and percentages were calculated, while cross-tabulations and chi-square tests were used to reveal the relationship between variables. The study response was 99%. In addition, the median (inter quartile range) was 8 (7–9). Scores below 8 were considered as poor and $\geq$8 as good in determining composite score for knowledge variables (Sudeshna & Aparajita 2012).

Study limitations

The use of cloth by respondents was classified as UMA because it is difficult to distinguish respondents that use cloth safely for menses management from others.

Informed consent

The study was approved by the Ife Central LGA education authority. In addition, participation was voluntary, and respondents previously obtained written parental consent. Respondents were assured of the confidentiality of the information provided and personal identifiers were removed in summary data.

RESULTS AND DISCUSSION

Socio demographic information of respondents

Socio-demographic information of respondents (Table 1) provided the characteristics of the study population, which could determine their knowledge and MHM behaviour. The mean age of respondents was 15.3 ± 1.5 years and ranged from 10 to 19 years. Their mean age at menarche was 12.8 years while over half of them (228, 57%) were in early adolescence (10–15 years). The respondents were in private (35.2%) and public (64.8%) schools, stratified into SS1 (102, 25.9%), SS2 (147, 37.3%) and SS3 (145, 36.8%). In addition, most respondents belong to Yoruba ethnicity (87.3%) and Christians (86.5%) while most mothers (89.7%) had at least secondary education.

Table 1 | Socio demographic information of respondents

Characteristics		Frequency (n)	Percentage (%)
Age group	≤ 10	1	0.3
	11–13	40	10
	14–16	280	70
	17–19	76	19
Current class	SS1	102	25.9
	SS2	147	37.3
	SS3	145	36.8
Ethnicity	Yoruba	349	87.2
	Hausa	9	2.3
	Igbo	36	9.0
	Others	6	1.5
Religion	Christianity	346	87.6
	Islam	48	12.2
	Traditional	1	0.9
Educational background of mothers	No formal education	14	3.6
	Primary	26	6.7
	Secondary	128	32.8
	Tertiary	222	56.9
Educational background of fathers	No formal education	6	1.5
	Primary	15	3.8
	Secondary	111	28.2
	Tertiary	261	66.4

Knowledge on menstruation and menstrual hygiene practices

The study revealed that 296 (74%) and 104 (26%) respondents had good and poor knowledge of menstruation and menstrual hygiene management (MMHM), respectively. In addition, most respondents across the adolescent age group categories had at least 61.8% rating in knowledge on MMHM, except those younger than 12 years where all (three respondents) had poor knowledge, though menstruating. Furthermore, most respondents (334, 85.4%) knew about menstruation before menarche (Table 2) and knowledge was significantly associated with mothers' educational status ($p = 0.029$), age in categories ($p = 0.11$) and the frequency of changing menstrual absorbents ($p = 0.003$), while there was no association between knowledge and the type of school attended by respondents ($p = 0.126$) and awareness about MMHM before menarche ($p = 0.416$) (Table 3).

Most respondents (388, 98%) saw menstruation as normal and a healthy sign of womanhood while over two-thirds (334, 67.8%) were aware about menstruation before menarche. Furthermore, most respondents (389, 97.3%) were aware that sanitary pads are among the best absorbents for safe MMHM while 337 (86.4%) and 373 (95.2%) categorised cloths and tissue-paper, though used, as UMA. Moreover, many respondents, 334 (85.6%), were aware that poor menstrual hygiene can predispose them to gynaecological and urinary infections (Table 2).

Practice of menstrual hygiene by the respondents

The respondents obtained information and guidance on menstrual absorbent preferences from mothers (67.3%), sisters (18.3%), peers (5.8%) and mass-media (5.6%). Moreover, 82.8% of respondents use sanitary absorbents while 67 (17.2%) use UMA (cloth and tissue paper). The choice of absorbent used depended on what was affordable (55, 23.8%), accessible (78, 19.5%) and convenient (240, 60%). Furthermore, the mean daily absorbents use was 2.5 ± 0.7 and adolescents attending private schools (122, 93.1%) use sanitary absorbents more when compared with those attending government schools (188, 78%). In addition, the respondents that currently use cloth absorbents use 'new'

Table 2 | Knowledge of respondents on menstruation and menstrual hygiene

Description	Yes		No	
	n	%	*n*	%
Is menstruation a normal process in females?	396	99.2	2	0.8
Is sanitary pad the best sanitary material to be used for menstruation?	389	98	8	2
Having a bath at least twice when menstruating is good to maintain hygiene during menstruation	392	99.0	4	1
Should you change your pad at least 3 times when menstruating?	365	92.6	29	7.4
Should you wash your hands before and after changing your pad?	385	97.5	10	2.5
Is tissue paper the best absorbent to maintain good hygiene for menstruation?	19	4.8	373	95.2
Is cloth the best absorbent to maintain good hygiene for menstruation?	53	13.6	337	86.4
Should sanitary materials be reused?	284	77	85	23
Should *used* absorbent be wrapped and safely disposed?	354	90.1	39	9.9
Do you think poor menstrual hygiene can result in infection?	334	85.6	56	14.4
Had knowledge about menstruation management before menarche?	334	85.4	57	14.6

(68.6%) and 'used' (31.4%) cloths and were from public schools (Table 4). Most respondents (301, 95.6%) practise hand-washing before and after changing menstrual absorbents.

Among the girls, 95 (24.2%) had previously changed menstrual absorbents in school while 297 (75.8%) had never done so and despite this, 51 (14.4%) respondents were absent from school during menstruation. In addition, a significant association exists among the types of school and menstrual absorbents used ($p = 0.0001$); mothers' education ($p = 0.000$); and disposal of used absorbents ($p = 0.004$ (Table 3).

The study further revealed that 84.1% bathe twice daily during menstruation probably because 60.4 and 39.5% had water within and around the house, respectively. They disposed of used absorbents through pit latrines (35.1%), burning (32.6%), in water closet toilets (16.9%) and co-mingled with domestic solid wastes (12.1%).

The study revealed that the toilets in private schools (water closet) were sanitary in comparison with those in government schools (pit latrine) and only 25% of the schools studied had a student:toilet ratio (27:1) within the recommended national standards (30:1) (FME 2006); and there were no gender-sensitive add-ins in any of the toilets (Table 5). Also, no school has any system for the management of menstrual absorbents. The type of school (public and government) was significantly associated with absenteeism during menstruation ($P = 0.000$) while Figure 2 shows the conceptual framework of key study findings.

DISCUSSION

Safe menstrual hygiene requires knowledge on the physiology of the female genitalia, menstruation and menstrual hygiene processes before menarche. In this study, respondents were aware about menstruation (85.4%) before experiencing it and knew that the sanitary pad is a good menstrual absorbent, though the composite knowledge differs from their MHM in practice. Notwithstanding, respondents' knowledge on MHM (94.3%) was better than that found by Abioye-Kuteyi (2000) where 60% of adolescents had correct knowledge on MHM. In contrast, the knowledge of respondents was lower compared with findings by Oche *et al.* (2012) where only 8.5% had poor knowledge and mostly had pre-menarcheal knowledge in agreement with our findings. The improved knowledge could possibly be attributed to: (1) mothers' education where the majority (89.7%) had post-secondary education; and (2) external support for females on MHM in selected secondary schools (Abioye-Kuteyi 2000; Lawan *et al.* 2010). According to Abioye-Kuteyi (2000), the home environment should provide the primary information on sexual education and most respondents received information on MMHM

Table 3 | Factors influencing menstrual hygiene behaviour among the respondents

Description		Good knowledge	Poor knowledge	Total	χ^2, DF and *P*-value	Outcome
Type of secondary schools	Private	105 (79.5%)	27 (20.5%)	132	$\chi^2 = 2.307$, df = 1,	No association
	Public	176 (72.4%)	67 (27.6%)	243	$P = 0.126$	
		281 (74.9%)	94 (25.1%)	375		
Mothers' education status	No formal education	7 (50%)	7 (50%)	14	$\chi^2 = 0.036$, df = 2,	Significant association
	Primary	17 (65.4%)	9 (34.6%)	26	$P = 0.029$	
	Secondary	91 (71.1%)	37 (28.9%)	128		
	Tertiary	176 (79.3%)	46 (20.7%)	222		
		291 (97.6%)	99 (25.4%)	390		
Awareness about menstruation before menarche	Yes	251 (75.1%)	83 (24.9%)	334	$\chi^2 = 0.633$, df = 1	No association
	No	40 (70.2%)	17 (29.8%)	57	$P = 0.416$	
		291 (74.4%)	100 (25.6%)	391		
Number of times absorbent changed	Once	9 (50%)	9 (50%)	18	$\chi^2 = 19.979$, df = 4	Significant association
	Two times	144 (75.8%)	46 (24.2%)	190	$P = 0.003$	
	Three times	131 (77.1%)	39 (22.9%)	170		
	Four times	9 (95%)	3 (25%)	12		
	Others	3 (30%)	7 (70%)	10		
		296 (74%)	104 (26%)	400		
Description		**Private school**	**Public school**	**Total**	**χ^2, DF and *P*-value**	**Outcome**
Absent from school during menstruation	Yes	5 (11.1%)	40 (88.9%)	45	$\chi^2 = 14.604$, df = 1	Significant association
	No	117 (40.6%)	171 (59.4%)	288	$P = 0.000$	
	Total	122 (36.6%)	211 (63.4%)	333		
Type of menstrual absorbent used	Sanitary	122 (93.1%)	9 (6.9%)	131	$\chi^2 = 13.972$, df = 1	Significant association
	Insanitary	188 (78.%)	53 (22%)	241	$P = 0.000$	
	Total	310 (83.3%)	62 (16.7%)	372		
Disposal of used menstrual absorbents	Burning	53 (43.4%)	69 (56.9%)	122	$\chi^2 = 15.227$, df = 4	Significant association
	With domestic solid wastes	17 (38.6%)	27 (61.4%)	44	$P = 0.004$	
	Pit latrine	45 (35.2%)	83 (64.8%)	128		
	Pour flush/water closet	9 (15%)	51 (85%)	60		
	Others	6 (46.2%)	7 (53.8%)	13		
	Total	136 (35.4%)	237 (64.6%)	367		

before menarche from homes and mass media, in agreement with Oche *et al*. (2012), where mothers were the commonest source of information. This was in contrast to the findings of El-Gilany *et al*. 2005 in Egypt, where mass-media was the commonest source of MMHM information.

Safe menstrual hygiene practice is one of the antidotes against menstruation-related gynaecological and urinary tract infections (WaterAid 2009; Ali & Rizvi 2010; Lawan *et al*. 2010; Sumpter & Torondel 2013) and the use of UMA was prevalent among adolescents in public-schools (22%) when compared with private schools (6.9%). The study showed that most adolescents knew that poor menstrual hygiene predisposes to infections, by an increasing knowledge with respect to respondents' classes by 82.7, 84.7, 89.4% in SSS1, SSS2, SSS3, respectively. The study showed that most respondents (82.8%) use sanitary pads in consonance with El-Gilany *et al*. (2005), Oche *et al*. (2012) and Sudeshna & Aparajita (2012), where a higher proportion of respondents use sanitary pads as menstrual absorbents, but in contrast with Baisley *et al*. (2009) in Tanzania where 18% of women use sanitary pads with the remainder using cloth or toilet paper. The concern therefore are those who use UMA (17.2%), though a lower proportion in this study when compared with those of Abioye-Kuteyi

Table 4 | Menstrual hygiene practices of respondents

Respondents' menstrual hygiene practice		*n*	%	Summary
Types of absorbents used by respondents	Sanitary pad only	326	82.3	328 (82.8%)*
	Tampon and sanitary pad	2	0.5	
	Cloth only	9	2.3	67 (17.2%)**
	Sanitary pad and cloth	42	10.6	
	Tissue paper only	7	1.8	
	Tissue paper and sanitary pad	9	2.3	
Number of times absorbents changed daily during menses	1	18	4.5	18 (4.5%)**
	2	190	47.5	372 (94.5%)*
	3	170	42.5	
	4	12	2.9	
Disposal methods for used menstrual absorbent during last menstrual cycle	Burning	127	32.6	311 (79.8%)*
	Routine solid waste management collection and disposal system	47	12.1	
	Pit/VIP latrine	137	35.1	
	Flushed in the toilet	66	16.9	79 (20.2%)**
	Others	13	3.3	
Type of cloth used, if cloth is used as absorbent	Used cloth	16	31.4	16 (31.4%)*
	New cloth	35	68.6	35 (68.6%)*
How frequently do you take your bath when menstruating?	Once daily	32	8.2	32 (8.2)**
	$\leq$ 2 times daily	355	91.2	355 (91.2%)*

Key: *good practice, **poor practice.

Table 5 | Inventory of water, sanitation and hygiene facilities in the studied secondary schools

Type of school	Water supply	Number of toilets	Privacy in toilets	Toilet cleanliness condition	Waste disposal facility	Hand washing facility
A (private)	3	3	4	3	3	3
E (private)	3	3	4	3	3	3
M (public)	1	2	2	2	2	2
I (public)	1	1	2	1	3	1

Key: 5 = excellent; 4 = very good; 3 = good; 2 = fair and 1 = poor.

(2000) and Adinma & Adinma (2008), where 66.3 and 55.7% of respondents, respectively, used UMA. The increasing use of sanitary pads could be attributed to a higher proportion of mothers who had at least secondary education (89.7%) and provided information, guidance and sanitary absorbents to respondents. Thus, the educational status of mothers improved menstrual hygiene behaviour in agreement with the study by Oche *et al.* (2012) though other determinants were not explored. In addition, absenteeism from schools during menstruation was significantly associated with the types of school attended, indicating the possibility that poor WASH facilities in government schools could be responsible (WaterAid 2009; House *et al.* 2012).

In this study, 45.4% of respondents change absorbents at least three times daily during menstruation while 2.5 ± 0.7 was the daily frequency of changing menstrual absorbents as recommended by WaterAid (2009). The daily absorbents change frequency in this study was better when compared with 2.3 ± 0.9 documented by Sudeshna & Aparajita (2012) but lower than that observed by Oche *et al.* (2012), where 70% of respondents changed absorbents at least three times daily. When menstruating, most respondents (84.1%) bathed at least twice daily in contrast to findings from Nepal where 51% of the respondents bathed once daily and about 43% on alternate days during menstruation (Adhikari *et al.* 2007) while Thakre *et al.* (2011) revealed that 62.3% of females abstained from

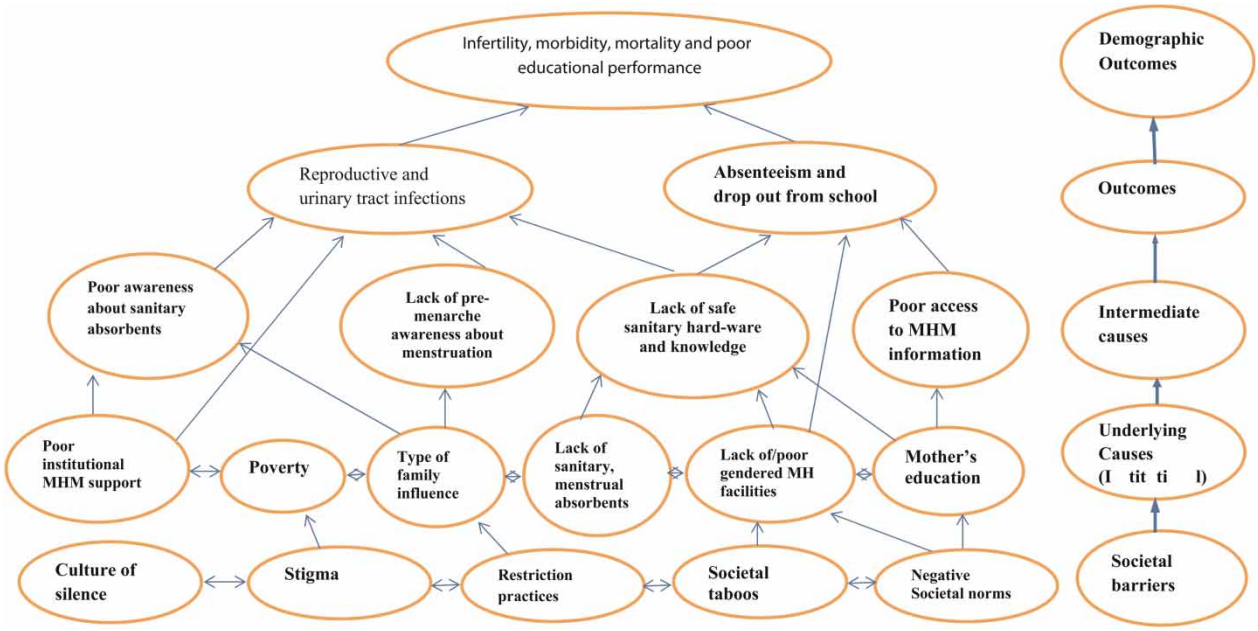

Figure 2 | Conceptual framework showing the relationships among the study findings.

showering during menstruation, due to the belief that bathing would either stop the menstrual flow or increase its intensity.

Moreover, most respondents changed menstrual absorbents at home while only 24.2% respondents had previously changed them in school, consequent of sudden onset of menses. The non-changing of absorbents by respondents in schools could arise due to dirty and shared toilets, lack of privacy, safe water and sanitary menstrual absorbents disposal facilities in schools, which resulted in absence by 14.4% of girls from schools during menstruation. In addition, it has been indicated that a woman throws away 125 to 150 kg of menstrual absorbents in her lifetime on average (Ten 2007). The study revealed that most adolescents disposed of used absorbents in pit latrines (35.17%), by burning (32.6%), in pour-flush toilets (16.9%) and in waste bins (12.1%) at home. The above was at variance with the report by Thakre *et al*. (2011) in India where burning was the major disposal method followed by the waste basket (37.9%), which, by contrast, has the lowest preference in the current study. However, the flushing system of the water closet latrine could be blocked by absorbents and a pit-based toilet would be filled up quickly by disposal of non-biodegradable absorbents.

Lastly, many respondents (67.7%) were not restricted during menstruation, in contrast to the works of Oche *et al*. (2012), Lawan *et al*. (2010) and El-Gilany *et al*. (2005), where girls were restrained from religious and cooking activities during menstruation. This is a good sign towards evolving a more equal society in the study area.

CONCLUSION

The study showed that mothers' educational status influenced respondents' knowledge on MHM though in reality, a marked difference existed between knowledge (good) and menstrual hygiene practice (poor) in the study. In addition, the poor state of sanitation and hygiene facilities in schools clouded safe MHM practice and contributes to school absenteeism by some adolescents during menstruation. Therefore, a gender-sensitive learning environment and WASH facilities (with girl-friendly MHM and used absorbents disposal facilities) should be provided to improve the probability of girls attending school during menstruation.

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