https://dx.doi.org/10.4314/dujopas.v11i1c.21
ISSN (Print): 2476-8316
ISSN (Online): 2635-3490
Dutse Journal of Pure and Applied Sciences (DUJOPAS), *Vol. 11 No. 1c March 2025*

Evaluation of Out-Of-School Adolescent Girls' Knowledge of Menstruation and Menstrual Hygiene Practices in Maiduguri, Borno State, Nigeria

Aisha Aliyu Abulfathi[1], Fatima Lawan Bukar[1], Mohammed Abubakar Abiso[2], Zara William Wudir[1], Binta Waziri Ibrahim[1], Muhammad Suleiman Ville[1], Ibrahim Gambo Chiroma[1], Abdulmumin Zakariya[1], Saratu Abel Buba[1]

[1]Department of Community Medicine,
University of Maiduguri,
Borno State,
Nigeria.

[2]Department of Family Medicine,
University of Maiduguri,
Borno State,
Nigeria.

Email: aishaaliyuabulfathi@gmail.com

Abstract
Menstruation, the shedding of the endometrial lining after embryo implantation failure, is often overlooked due to physical manifestations and a lack of safe practices. Cultural norms and taboos affect society's perception of women and menstruation, usually leading to a gap in gender equality. Addressing knowledge gaps is important, as shame and poor menstrual hygiene management (MHM) have been associated with a lack of knowledge. This study assessed the knowledge of menstruation and the practice of menstrual hygiene among out-of-school adolescent girls in Maiduguri, Borno State. The study utilised an interview-administered questionnaire with a multi-stage sampling technique and analysed the data using the Statistical Package for Social Sciences. The 16-17 age group accounted for the majority of respondents, with 210 not knowing about menstruation before menarche and 216 and 199 using disposable and non-disposable sanitary pads, respectively. The majority of respondents, 62.3% and 67.9%, exhibited good knowledge and practice in menstruation and menstrual hygiene. One-third, 34.5% of respondents used disposable pads, 57.7% changed them daily, 87.3% cleaned their bodies with soap and water, and 55.9% disposed of them in the toilet. The Borno State and the federal government should promote adolescent education, subsidise menstrual hygiene products, and enhance public WASH facilities to facilitate effective change among adolescent girls.

Keywords: Menstrual hygiene, Knowledge, Practice, Adolescent, Out-of-School

INTRODUCTION
Menstruation is a common and normal female reproductive process, onset during adolescence, marked by dominant physiological and emotional changes.(Belayneh and Mekuriaw, 2019) and the onset denotes a landmark event in the pubertal development of the adolescent girl (Nnennaya et al., 2021). The World Health Organization (WHO) defines adolescents as individuals aged 10-19 years (Boruah et al., 2022). Adolescence marks the

**Author for Correspondence*

transition from childhood to adulthood, a crucial period for females to prepare and adjust to safely managing menstrual bleeding (Belayneh and Mekuriaw, 2019); (Boruah et al., 2022). Most women are uncomfortable discussing "menses" as it is a social taboo, and adolescent girls do not have access to adequate information, even the little information they receive, most commonly from religious institutions, peers, and family members, is often selective and surrounded by misperceptions(Belayneh and Mekuriaw, 2019).

Menstrual knowledge and hygiene are essential for adolescent-aged individuals, as the teenage period begins throughout this period. Girls in countries with low to middle incomes (LMICs) are frequently misled or uneducated regarding sexual and reproductive health knowledge, leaving them unprepared for menstruation and menstrual hygiene knowledge. Emphasis is on the facts about how to educate adolescent females on the proper and clean management of menstruation (Uzoechi et al., 2023). Studies from low-income countries reveal that a significant number of girls begin menstruation without any prior knowledge or understanding of the process (Fehintola et al., 2017). A study in India found that only 36.95% of girls were aware of menstruation before menarche, with their primary source of information being their mothers (71.33%)(Kitesa, 2016). A systematic review of 138 studies related to mensuration done in India observed that only 25% of the girls were aware of the cause of bleeding, and more than 50% were either unaware or misinformed (Prasad et al., 2024).

Menstrual hygiene management practices vary globally and are influenced by socioeconomic status, personal preferences, local traditions, and access to resources. These practices can be particularly unhygienic for girls and women in poorer settings; Das et al., 2015). Poor menstrual hygiene management can increase a woman's vulnerability to reproductive tract infections (RTI) (Fehintola et al., 2017). Poor menstrual hygiene can cause genital discomfort, irritation, rashes, and bruising during menses due to the quality of menstrual materials or not changing menstrual pads frequently enough and is also associated with increased risk of reproductive and urinary tract infections, cervical cancer and adverse pregnancy outcomes (Sychareun et al.,2020).

There are several gaps in knowledge and practice of menstrual hygiene among out-of-school adolescent girls, serving as barriers to adolescent health, and many countries and regions have limited information on the knowledge and practice of menstrual hygiene among out-of-school girls, especially northeast Nigeria.

This study addresses the critical research gap by specifically assessing the knowledge and practices related to menstruation and menstrual hygiene among out-of-school adolescent girls in Maiduguri, Borno State, Nigeria. The study's novelty lies in its specific focus on out-of-school girls in Maiduguri. This is an opportunity for the targeted interventions and policies that will promote menstrual health and hygiene among this vulnerable group.

This study also contributes to the growing literature on the knowledge and practice of menstrual hygiene among out-of-school adolescents in Maiduguri. In contrast to most studies, which focus on school-based, meaning we know little about out-of-school adolescents.

MATERIALS AND METHODS

Study area
Maiduguri, Borno state's capital, is a 50,799 square kilometres area in northeastern Nigeria, with a projected population of 5,860,200 in 2016. It comprises 27 wards and has 51% boys and 49% girls adolescents("Borno (State, Nigeria) - Population Statistics, Charts, Map and Location," n.d.).

Study design
The study assessed the knowledge and practice of menstrual hygiene among out-of-school adolescent girls in Borno state through community-based descriptive cross-sectional research.

Study population
The study population were out-of-school adolescent girls between 10-19 years in Maiduguri, Borno state. **Inclusion Criteria**: Out-of-school adolescent girls living in Maiduguri for at least six months and those who are menstruating. **Exclusion Criteria**: Out-of-school adolescent girls who were very ill during the survey.

Sample Size Estimation
A minimum sample size was calculated with Leslie Kish's formula ("Sample Size Determination - Nurses Revision," 2023).
$n = Z^2pq/d^2$
where n=the minimum sample size.
Z standard normal deviation for desired significance level = 1.96 (at 95 % confidence interval).
p= 0.57 (Nnennaya et al., 2021).
q=1-p=1-0.57=0.43
d= 0.05 Using the non-response rate of 10 per cent (10 per cent of sample size), the, adjusted sample size was=376 +38= 414. The sample size was adjusted to 414 to take care of non-response/inappropriate questionnaires.

Sampling Technique
The research was conducted in Maiduguri Metropolitan Council and Jere Local Government Area using a multi-stage sampling technique.

Sources of Data and Data Collection
Data was collected using a semi-structured questionnaire applying the interview administered technique. The questions were structured in a way that reflected the objective of the study.

Data analysis
A correct response to ten menstruation-related categorical questions earned a one score for knowledge questions, while an incorrect response received a zero score, the summed-up points are ten as the maximum and zero as the minimum. The menstrual hygiene practice questions were scored with one point for correct answers to twenty categorical questions and zero points for incorrect answers, score points were converted to percentages and re-categorized as good (>50 per cent) and poor (>50 per cent). The information obtained from the questionnaire was analysed statistically using the Statistical Package for Social Sciences (SPSS) software version 20, 2014 edition. The analysis used frequency distribution tables, categorical variables, means, standard deviation, and other descriptive measures, with Chi-square for association and significance set at $p \leq 0.05$.

Ethical consideration: The study received ethical approval (SHREC approval no. 30/2023) the Ministry of Health and Human Services in Borno state obtained informed consent from respondents and followed the Helsinki Declaration.

RESULTS

The study involved out-of-school adolescent girls in Maiduguri, Borno State, administering 414 questionnaires with a 100% response rate. The study involved 169 (40.8%) participants aged 16-17, with 371 (89.6%) practising Islam and 8.9% practising Christianity, with a mean age of 16.8 ± 1.6 SD. The study primarily surveyed Kanuri ethnicity (43.2%), with a majority of respondents being single (89.3%). Over half of the respondents (55.1%) attended school, while a significant proportion (44.9%) did not from Table 1.

Table 1 Socio-demographic Characteristics of Out-of-school Adolescent Girls in Maiduguri, Borno State.

Variables	Frequency(n=414)	Percentages (%)
Age (Years)		
12-13	15	3.6
14-15	71	17.1
16-17	169	40.8
18-19	159	38.4
Religion		
Christianity	43	10.4
Islam	371	89.6
Ethnicity		
Kanuri	179	43.2
Hausa/Fulani	83	20.0
Shuwa	45	10.9
Babur	41	9.9
Others	66	15.9
Marital Status		
Single	370	89.3
Married	40	9.7
Divorced	4	1.0
Ever been to school?		
No	186	44.9
Yes	228	55.1
Type of School		
Formal	187	82.0
Quranic	40	17.5
Vocational	1	0.5

The study revealed that (55.6%) of respondents are involved in handy crafts like cap knitting and tailoring, while 14.3% have no occupation, and over half of their parents/guardians have no formal education. The majority of respondents' parents, comprising 39.1%, are traders, followed by labourers (19.1%), farmers (18.6%), and civil servants (17.1%) from Table 2.

Table 2: Socio-demographic Characteristics of Out-of-school Adolescent Girls in Maiduguri, Borno State Continuation.

Variables	Frequency (n)	Percentage (%)
The level at formal school		
Primary	66	35.3
Secondary	113	60.4
Tertiary	8	4.3
Occupation		
Trading	47	11.4
Hawking	24	5.8
Food vendor	50	12.1

Handy craft	230	55.6
None	59	14.3
Others	4	1.0
Parents/guardians' level of education		
Primary	13	3.1
Secondary	60	14.5
Tertiary	43	10.4
I don't know	62	15.0
None	236	57.0
Parents/guardians occupation		
Trader	162	39.1
Civil servant	71	17.1
Farmer	77	18.6
Labourer	79	19.1
Others	25	6.1

The majority of respondents, 78.7%, began menstruation between the ages of 13-15, with a mean age of 13.7±1.3 years. The majority of respondents (50.7%) had no prior knowledge of menstruation, while 27.2% of those with knowledge (49.3%) sourced it from their mothers. About 37.4% of respondents don't know menstruation causes, while 37% know it's natural. Most (87.7%) have a 21-35-day cycle, with 89.6% have 2-7-day normal bleeding duration, while 10.4% experience abnormal bleeding. The majority of respondents (62.1%) find it difficult to discuss menstruation with family or friends, with 197 (76.7%) explaining their shame and 25 (9.7%) citing cultural taboos. The majority of respondents (62.3%) have good knowledge scores of menstruation and hygiene, with 46.8% of respondents familiar with disposable sanitary pads and 44.1% familiar with non-disposable ones from Table 3.

Table 3: Knowledge of Menstruation among out-of-school adolescent Girls in Maiduguri, Borno State.

Variables	Frequency (n=414)	Percentage (%)
Age at Menarche (years)		
10-12	65	15.7
13-15	326	78.7
16-18	23	5.6
Knowledge of Menstruation before 1st onset		
Yes	204	49.3
No	210	50.7
Source of Information		
Mother	111	27.2
Older Sister	102	25.0
Friends/Family	36	8.8
Islamiyah	110	27.0
Formal School	42	10.3
Media	7	1.7
Causes of Menstruation		
Diseases	57	13.8
Curse from God	49	11.8
Natural	153	37.0
I don't know	155	37.4
Cycle Length (Days)		
Less than 21	34	8.2
21-35	363	87.7
Greater than 35	13	3.1
I don't know	4	1.0
Days of Bleeding		
Less than 2 days	34	8.2

2-7 days	363	87.7
Greater than 7 days	14	4.1
Have a problem discussing Menstruation with Friends/ Family.		
Yes	257	62.1
No	157	37.9
Problems		
Shame	197	76.6
Fear	12	4.7
Cultural taboo	28	18.7
Absorbent Materials*		
Disposable pad	364	46.8
Non-disposable pad	343	44.1
Pieces of clothes	44	5.7
Tissue paper	22	2.8
Newspaper	2	0.3
Cotton wool	2	0.3
Prevalence of Knowledge		
Good Knowledge	258	62.3
Poor Knowledge	156	37.7

The study found that 34.5% of respondents used disposable sanitary pads, 31.7% used non-disposable ones, 29.7% used cloth for menstruation, and 58.1% of respondents cited affordability as a reason. Over half of respondents (57.7%) change absorbent 1-2 times daily, while 89.2% wash non-disposable pads with soap and water, and 50% expose them to sunlight for drying Table 4. Over half of the respondents (58.4%) only wash their hands after changing absorbents, while a majority (73.4%) take baths regularly, and 87.3% clean their genitalia with soap and water while only 11.5% use water. Most respondents (67.9%) have good menstrual hygiene scores, 71 (24.1%) satisfactorily dispose of sanitary pads, and 165 (54.9%) dispose of them in the toilet.

Table 4: Practice of Menstrual Hygiene Among Out-of-school Adolescent Girls in Maiduguri, Borno State.

Variables	Frequency (n)	Percentage (%)
Absorbent used		
Disposable pad	216	34.5
Non-disposable pad	199	31.7
Pieces of clothes	186	29.7
Tissues paper	22	3.5
Newspaper	2	0.3
Cotton wool	2	0.3
How many times do you change absorbent in a day?		
1-2 times	239	57.7
3-4 times	162	39.9
>4 times	10	2.4
Reasons for not using Sanitary pad		
No reason	53	24.7
Difficult in discarding	10	4.7
Not affordable	125	58.1
Shame when buying	1	0.5
I don't know about it	26	12.1
How do you clean the non-disposable pad?		
Wash with soap and water	239	89.2
Wash with water only	27	10.1
I don't wash them	2	0.7

How do you dry a non-disposable pad?		
Exposed to Sunlight	134	50.0
Dried inside my room	75	27.9
Dried beneath other clothes	11	4.1
In the toilet	48	17.8
How do you wash your hands?		
Before the change of absorbent	16	3.6
After a change of absorbent	241	58.4
Before and after a change of absorbent	129	31.4
None	28	6.6
How do you clean your body?		
Take a bath routinely	304	73.4
Clean around genitalia only	103	24.9
Mop my body with a soaked rag	7	1.7
What do you use to clean your genitalia?		
Soap and water	360	87.3
Water only	48	11.5
Mop with a piece of cloth	6	1.2
Frequency of cleaning genitalia		
Once a day	20	4.8
Twice a day	238	57.5
Every change of absorbent	156	37.7
How do you dispose of sanitary pad?		
In the toilet	165	55.9
Wrapped up and thrown away in the dustbin	71	24.1
By the roadside	9	3.1
Wrapped and burnt	50	16.9
Practice score		
Poor	133	32.1
Good	281	67.9

Table 5 below shows associations between socio-demographic variables and the level of knowledge of menstruation, and it reveals that there is no statistically significant association.

Table 5: Factors Associated with the Level of Knowledge among Out-of-school Adolescent Girls in Maiduguri, Borno State.

Variables	Poor Knowledge n (%)	Good Knowledge n (%)	Test statistics	P- value
Age (years)				
≤ 13	9(60)	6(40)	5.272 χ^2	0.153
14-15	23(32.4)	48(67.6)		
16-17	59(34.9)	110(65.1)		
18-19	65(40.9)	94(59.1)		
Religion				
Christianity	13(35.1)	24(64.9)	0.488†	0.784
Islam	138(37.4)	231(62.6)		
Traditional	3(50)	3(50)		
Ethnicity				
Kanuri	60(33.5)	119(66.5)	3.998 χ^2	0.262
Hausa/Fulani	37(44.6)	46(55.4)		
Shuwa	14(31.1)	31(68.9)		
Babur	17(41.5)	24(58.5)		
Others	27(40.9)	39(59.1)		

Marital status				
Single	127(34.3)	243(65.7)	10.5088†	0.015
Married	20(50.0)	20(50.0)		
Divorced	1(50.0)	1(50.0)		
Separated	1(50.0)	1(50.0)		
Ever been to School				
Yes	88(38.6)	140(61.4)	0.116 χ^2	0.734
No	68(36.6)	118(63.4)		
Occupation				
Handy craft	82(35.7)	148(64.3)	2.565 χ^2	0.633
Food vendor	17(34.0)	33(66.0)		
Trader	22(46.8)	25(53.2)		
Others	35(40.2)	52(59.8)		
Parent/guardian level of education				
Primary	5(38.5)	8(61.5)	4.910 χ^2	0.427
Secondary	20(33.3)	40(66.7)		
Degree	10(38.5)	16(61.5)		
Others	121(38.4)	194(61.6)		
Parent/guardian occupation				
Farmer	29(37.7)	48(62.3)	7.4819 χ^2	0.1125
Trader	64(39.5)	98(60.5)		
Civil Servant	25(35.2)	46(64.8)		
Laborer	25(31.6)	54(68.4)		
Others	15(60.0)	10(40.0)		

χ^2Chi-square, † Fisher's Exact Test

The table below shows the association between the practice of menstrual hygiene and socio-demographic characteristics. The age of respondents, their occupations, and parents' level of education were statistically significant at a p-value less than or equal to 0.005.

Table 6: Factors Associated with the Practice of Menstrual Hygiene among Out-of-school Adolescent Girls in Maiduguri, Borno State.

Variables	Poor Practice n (%)	Good Practice n (%)	Test statistics	P- value
Age (years)				
≤ 13	10(66.7)	5(33.3)	9.292 χ^2	0.026*
14-15	25(35.2)	46(64.8)		
16-17	51(30.2)	118(69.8)		
18-19	47(29.6)	112(70.4)		
Religion				
Christianity	11(25.6)	32(74.4)	1.112†	0.57
Islam	121(32.6)	250(67.4)		
Traditional	2(33.3)	4(66.7)		
Ethnicity				
Kanuri	63(35.2)	116(64.8)	5.5376 χ^2	0.2365
Hausa/Fulani	24(29.9)	59(71.1)		
Shuwa	18(40.0)	27(60.0)		
Babur	8(19.5)	33(80.5)		
Others	20(30.3)	46(69.7)		
Marital status				
Single	133(35.9)	237(64.1)	3.3161†	0.3454
Married	20(50.0)	20(50.0)		
Divorced	1(50.0)	1(50.0)		
Separated	1(50.0)	1(50.0)		
Ever been to School				
Yes	88(38.6)	140(61.4)	0.1811 χ^2	0.6705

No	68(36.6)	118(63.4)		
Occupation				
Handy craft	82(35.7)	148(64.3)	16.956†	0.005*
Food vendor	17(34.0)	33(66.0)		
Trader	22(46.8)	25(53.2)		
Hawking	6(25.0)	18(75.0)		
Others	35(59.3)	24(40.7)		
None	3(75.0)	1(25.0)		
Parent/guardian level of education				
None	96(40.7)	140(59.3)	21.3659†	< 0.001*
Primary	3(23.1)	10(76.9)		
Secondary	12(20.0)	48(80.0)		
Degree	3(11.5)	23(88.5)		
Diploma	2(11.8)	15(88.2)		
I don't know	17(27.4)	45(72.6)		
Parent/guardian occupation				
Farmer	29(37.7)	48(62.3)	6.8677 χ^2	0.1431
Trader	64(39.5)	98(60.5)		
Civil Servant	25(35.2)	46(64.8)		
Laborer	25(31.6)	54(68.4)		
Others	15(60.0)	10(40.0)		

*Statistically significant, χ^2Chi-square, † Fisher's Exact Test

DISCUSSION

The onset of the first menstrual cycle and other major hormonal and emotional changes occur during adolescence, which is a crucial time for females (Vinod and Kaimal, 2023). The study found that over half of adolescents have good knowledge about menstruation and hygiene, are more between the age group 14-15 years and Kanuri/Shuwa tribes because they are the predominates in the study area, while 37% believe it's a physiological process and 11.8% believe it's a curse from God. The study's results exceeded previous research in Northeast Ethiopia, Northwestern Nigeria, and Southwestern Nigeria, with values of 55.9%, 51.2%, and 51.2%, respectively (Fehintola et al., 2017); Lawan et al., 2010); Tegegne and Sisay, 2014). The disparity may be attributed to inadequate family communication regarding menstruation and menstrual hygiene issues.

A study conducted in Ethiopia revealed that despite the study's findings, high knowledge of menstrual hygiene was obtained at a rate of 71.9% (Kitesa, 2016), possibly due to information provided about menstruation and menstrual hygiene by schools and families. The study found that 27.2% of respondents received menstrual information from their mothers, followed by 27% from Islamiyah and 25% from elder sisters. The findings align with those from studies conducted in Ethiopia and India (Tegegne and Sisay, 2014), (M et al., 2023). The similarity may be due to girls discussing menstruation and hygiene openly with their friends and peers. The discrepancy may be due to the measurement techniques used in studies and the socio-cultural differences among the participants. The study found that girls in the study area prefer using cloths and rags as menstrual absorbents over disposable sanitary napkins. Only 34.5% of adolescent girls use disposable sanitary napkins during their last menstrual period, while 67.9% generally practice good menstrual hygiene. This study's results are less accurate compared to a study conducted in India (M et al., 2023; Boruah et al., 2022). Disposable sanitary napkins may be avoided due to poor communication, educational awareness, and lower socio-economic status, as they may not be affordable or available at low cost.

The study also aimed to identify factors influencing socio-demographic characteristics and hygiene practices of adolescent school girls, which reveals the age of respondents, their occupations, and parents' level of education were statistically significant. A study in Nepal similar to this study found a significant association between out-of-school adolescent girls' age, occupation, and their parents' educational status (Bhusal, 2020)).

In a Nepal study, it was found that the education of sisters significantly impacts the practice of menstrual hygiene ((Kitesa, 2016). Girls with educated parents are better observed and guided during their menstrual period compared to those without education.

The study's strength lies in its robust sample size of 414 out-of-school adolescent girls, ensuring representativeness and generalizability through a multistage stratified random sampling technique. The questionnaire was comprehensive, pretested, and adapted from validated studies, with mainly closed-ended questions to reduce subjectivity in the context. The associated factors were identified through appropriate statistical tests. The study aimed to assess menstruation knowledge and hygiene practices in private settings by involving female data collectors to minimise social desirability bias.

The study has limitations, including recall bias, as certain information relies on participants' memories. The study design's cross-sectional nature may not accurately depict the cause-and-effect relationships between study variables. This study exclusively utilises quantitative data collection methods. The recommendation is for a more comprehensive and exclusive study design with more exhaustive variables.

CONCLUSION

Out-of-school adolescent girls exhibited good knowledge and practised menstrual hygiene, with one-third using sanitary disposable pads. The primary factors contributing to this are the respondent's age, occupation, and the education status of their parents or guardians. Adolescent girls need awareness creation and advocacy programs to improve knowledge and safe, hygienic practices of menstruation flow in the community and public environment.

REFERENCES

Belayneh, Z., Mekuriaw, B., 2019. Knowledge and menstrual hygiene practice among adolescent school girls in southern Ethiopia: a cross-sectional study. BMC Public Health 19, 1595. https://doi.org/10.1186/s12889-019-7973-9

Bhusal, C.K., 2020. Practice of Menstrual Hygiene and Associated Factors among Adolescent School Girls in Dang District, Nepal. Adv. Prev. Med. 2020, 1292070. https://doi.org/10.1155/2020/1292070

Borno (State, Nigeria) - Population Statistics, Charts, Map and Location [WWW Document], n.d. URL https://www.citypopulation.de/en/nigeria/admin/NGA008__borno/ (accessed 2.19.25).

Boruah, B., Hakmaosa, A., Hajong, S., 2022. A study on the knowledge and practices of menstrual hygiene among the adolescent girls of Nagaon, Barpeta District, Assam. J. Fam. Med. Prim. Care 11, 5918–5923. https://doi.org/10.4103/jfmpc.jfmpc_146_22

Das, P., Baker, K.K., Dutta, A., Swain, T., Sahoo, S., Das, B.S., Panda, B., Nayak, A., Bara, M., Bilung, B., Mishra, P.R., Panigrahi, P., Cairncross, S., Torondel, B., 2015. Menstrual Hygiene Practices, WASH Access and the Risk of Urogenital Infection in Women from Odisha, India. PLOS ONE 10, e0130777. https://doi.org/10.1371/journal.pone.0130777

Fehintola, F.O., Fehintola, A.O., Aremu, A.O., Idowu, A., Ogunlaja, O.A., Ogunlaja, I.P., 2017. Assessment of knowledge, attitude and practice about menstruation and menstrual hygiene among secondary high school girls in Ogbomoso, Oyo state, Nigeria. Int. J. Reprod. Contracept. Obstet. Gynecol. 6, 1726. https://doi.org/10.18203/2320-1770.ijrcog20171932

Kitesa, B., 2016. Assessment of Knowledge and Practice of Adolescent In-School Girls Towards Menstrual Hygiene Management and Determining Factors in Lucy Village of Ethiopian Great Rift Valley, 2016. Int. J. Immunol. 4, 52. https://doi.org/10.11648/j.iji.20160406.12

Lawan, U.M., Yusuf, N.W., Musa, A.B., 2010. Menstruation and menstrual hygiene amongst adolescent school girls in Kano, Northwestern Nigeria. Afr. J. Reprod. Health 14, 201–207.

M, Y., Trivedi, N.S., Damor, R., Patel, M., Ladani, H., Ramachandran, A., Vamja, R., Surati, B., 2023. Assessment of Knowledge, Attitudes, and Practices Regarding Menstrual Hygiene Management Among Adolescent Schoolgirls (10–19 Years) in the Saurashtra Region, Gujarat. Cureus. https://doi.org/10.7759/cureus.50950

Nnennaya, E.U., Atinge, S., Dogara, S.P., Ubandoma, R.J., 2021. Menstrual hygiene management among adolescent school girls in Taraba State, Nigeria. Afr. Health Sci. 21, 842–851. https://doi.org/10.4314/ahs.v21i2.45

Prasad, R.R., Dwivedi, H., Shetye, M., 2024. Understanding challenges related to menstrual hygiene management: Knowledge and practices among the adolescent girls in urban slums of Jaipur, India. J. Fam. Med. Prim. Care 13, 1055–1061. https://doi.org/10.4103/jfmpc.jfmpc_1604_23

Sample Size Determination - Nurses Revision, 2023. URL https://nursesrevisionuganda.com/sample-size-determination/ (accessed 11.13.24).

Tegegne, T.K., Sisay, M.M., 2014. Menstrual hygiene management and school absenteeism among female adolescent students in Northeast Ethiopia. BMC Public Health 14, 1118. https://doi.org/10.1186/1471-2458-14-1118

Uzoechi, C.A., Parsa, A.D., Mahmud, I., Alasqah, I., Kabir, R., 2023. Menstruation among In-School Adolescent Girls and Its Literacy and Practices in Nigeria: A Systematic Review. Medicina (Mex.) 59, 2073. https://doi.org/10.3390/medicina59122073

Vinod, A., Kaimal, R.S., 2023. Perceptions and practices related to menstruation and reproductive health in adolescent girls in an urban population - A cross-sectional study. J. Fam. Med. Prim. Care 12, 717–721. https://doi.org/10.4103/jfmpc.jfmpc_1752_22