www.ajbrui.org

Afr. J. Biomed. Res. Vol. 23 (September, 2020); 321- 326

Research Article

An Exploratory Study of Menstruation and Menstrual Hygiene Knowledge Among Adolescents in Urban and Rural Secondary Schools in Cross River State, Nigeria

***Edet O.B.[1], Bassey P.E.M.[2], Esienumoh E.E.[1], Ndep A.O.[2]**

Department of [1]Nursing Science and [2]Public Health, College of Medical Sciences, University of Calabar, Calabar. Cross Rivers State, Nigeria

ABSTRACT

Menstruation and menstrual hygiene knowledge is fundamental to the health and well-being of adolescent females, however little attention is paid to the acquisition of the right knowledge about this important aspect of adolescent reproductive health in developing counties, Nigeria inclusive. The study was aimed at determining menstruation and menstrual hygiene knowledge among secondary school students as a basis for planning an appropriate health promotion intervention. A cross-sectional study conducted in selected urban and rural secondary schools in Cross River State, Nigeria. Using a semi-structured questionnaire, 1,006 adolescent female students from junior secondary to senior secondary in eight schools were surveyed. The research protocol was approved by the Ethical Review Board of the Cross-River State, Ministry of Health. Of the 1,006 respondents, 600(59.6%) were urban-based while 406 (40.4%) were rural-based. Most 556 (55.3%) were from public schools while 450(44.7%) were from private schools. Mean age was 14.2±2.71 while age at menarche was 10.95±4.10. Age at menarche in urban schools was 11.1±0.157 while that of rural schools was 10.71±0.239. On knowledge, 230(56.7%) rural-based adolescent female students had a significantly poor knowledge of menstruation and menstrual hygiene practices compared with their urban-based counterparts 253 (42.2%). Majority 435(72.5%) in urban and 327(80.5%) in rural schools obtained information about menstruation from their mothers. Similarly, 407(67.8%) in urban schools and 318 (78.3%) from rural schools were informed about menstrual hygiene by their mothers. There is an urban-rural gap in knowledge of menstruation and menstrual hygiene. Parental role in menstrual hygiene education is critical.

Keywords: *In-school Adolescents, Menarche, Menstruation, Menstrual Hygiene*

*Author for correspondence: *Email: bamideleedet@yahoo.com;* Tel: *+234-8039775596*

Received: March, 2020; Accepted: August, 2020

Abstracted by:

Bioline International, African Journals online (AJOL), Index Copernicus, African Index Medicus (WHO), Excerpta medica (EMBASE), CAB Abstracts, SCOPUS, Global Health Abstracts, Asian Science Index, Index Veterinarius

INTRODUCTION

Menstruation, the monthly cyclical bleeding in women characterized by the discharge of uterine blood through the vagina, is a normal physiological process in females (Hamal & Susma, 2014). The onset of menstruation symbolizes both femininity and fertility (Omran & Al Hafez, 2006). Most adolescents experience menarche which is the first onset of menstruation and the journey into womanhood at about 12-13 years (Hawthorne, 2002).

Age at menarche is variable across geographic locations, countries, races and even communities (Yermachenko & Dvornyk, 2014; Parent *et al*, 2003). The average age of menarche is however determined by biological, nutritional, socio-cultural and geographic factors (Bata, 2012). Adolescent girls living in Western countries tend to have earlier onsets of menarche (Ulijaszek,1991) compared to their peers in developing countries (Ayele & Berhan, 2013)

Menstrual hygiene is an overlooked health and social issue which if not adequately addressed, can militate against the holistic development of the sexual and reproductive health of the girl child. Menstrual hygiene practices are to a large extent socially, culturally and religiously defined (Kumar & Srivastava, 2011; Bhartiya, 2013) and in most cultures, issues related to sexuality and womanhood are not openly discussed. With the attainment of puberty, feminine personal hygiene becomes an important issue, and more so during menstruation, because the female genitalia is more vulnerable to bacterial infection during menstruation due to change in the vagina PH balance (Diorgu & Diorgu, 2019). Therefore ensuring good menstrual hygiene management is quite crucial to preventing

infections of the female genital tract and the attendant complications that may arise later in life from possible spread of the cervix and uterus. Menstrual hygiene management and care is an essential aspect of personal hygiene for all adolescent girls from to menopause (Diorgu & Diorgu, 2019). There is therefore the need for both parents at home and teachers in the schools to be well informed about reproductive health issues and to proactively be able to address the unfounded cultural myths and religious taboos about menstruation and menstrual care practices.

Information about reproductive health issues; including menstruation is crucial for adolescent girls with the onset of menarche and the progression to womanhood Lack of proper information about safe and hygienic menstrual practices for adolescent girls constitutes a huge knowledge gap and an unmet sexuality education need. This knowledge gap is also disproportionately spread among rural and urban locations. Generally, in developing countries, rural dwellers tend to be more disadvantaged in terms of access to health information compared with urban dwellers and the disparity in access to health information could also impact negatively impact on the access to needed information for improved menstrual hygiene management for rural dwellers.

To the best of our knowledge no comparative study has been performed to assess the knowledge, attitude and practice of menstrual hygiene among urban and rural adolescent in-school girls in Cross River State in Nigeria. The main purpose of this study was to obtain an insight into the menstruation and menstrual hygiene knowledge of adolescent junior and senior secondary school students in Cross River State and to provide health education where needed to enhance hygienic management knowledge. Currently, not much is known about what adolescent students in Cross River State know about menstruation and menstrual hygiene; as such the research will be exploratory to gain a better insight into the issue and this will be followed up with a health promotion component. In this study, the following specific objectives were explored:

- To determine the level of awareness of menstruation and menstrual hygiene among in-school adolescent girls in urban and rural secondary schools in Cross River State.
- To identify sources of information on menstruation and menstrual hygiene among in-school adolescent girls in urban and rural secondary schools in Cross River State.
- To assess in-school adolescent girls' knowledge-base and baseline knowledge of menstruation and menstrual hygiene in urban and rural secondary schools in Cross River State.

MATERIALS AND METHODS

Study Design: The exploratory, descriptive. Cross-sectional design was used for this study. This was considered appropriate because this is a baseline study that is intended to inform the researchers about the gaps to be addressed by the educational intervention.

Study setting: The study setting comprised of eight secondary schools selected from two Local Government Areas in Cross River State. Cross River State is a coastal state in the South-South zone of Nigeria, located in the Niger Delta region of the country, occupying 20,156 square kilometers. It is bounded on the North by Benue State, Enugu and Abia States to the West, to the East by the Cameroon Republic and to the South by Akwa-Ibom State and the Atlantic Ocean. It has a population of 3,344,000 (Cross River Online, 2020). It is made up of 18 Local Government Areas (LGA). The three major language groups in Cross River State are Efik, Ejagham and Bekwara. The Cross River State economy is predominantly agricultural and sub-divided into public and private sectors.

Study Population and Sample: Cross River State have 18 Local government areas (LGAs), comprising 6 urban and 12 rural LGAs). For the purpose of this study, a multi-stage sampling technique was adopted, since this approach increases representativeness of the sample, ensures accurate estimate of subgroups, and increase precision of estimates. The LGAs were grouped accordingly into the rural-urban categorizations and one urban LGA and 1 rural LGA was randomly selected from each of the groups. The secondary schools in the selected LGAs were then be grouped and listed according to their ownership (Public and Private). In the selected urban LGA, two publicly and two privately owned schools were randomly selected from the school lists. However, for the rural LGAs where the number of privately-owned secondary schools were few, two public schools and the available private school(s) were selected. In all 8 secondary schools were selected for the study.

The target populations of this study were in-school adolescent girls in Junior Secondary 2 (JSS2) to Senior Secondary (SSS) 2, within the age bracket of 10 to 18 years. The female adolescent students in Junior Secondary school (JSS) to Senior Secondary School (SSS) 2 in the selected schools were listed into a sampling frame and a multi-stage sampling method was applied to select the study sample.

Data Collection

The procedure and method of completion of the questionnaire was explained to the participants by the researchers. Thereafter, the 1006 copies of the structured questionnaire were administered on the respondents in their respective classrooms during the class session, which they completed within 40 minutes.

The Questionnaire Survey: The questionnaire consisted of three parts. The first part captured socio-demographic characteristics of the respondents while the second part elicited information on knowledge base and awareness of menstrual hygiene and menstruation. The third part was on knowledge of menstrual hygiene and menstruation. The questionnaire was pretested using students from urban and rural schools which are not part of the main study. A test-retest approach was used to establish reliability of the instrument, a Cronbach's Alpha/ Coefficient Alpha of 0.704 was obtained which was considered acceptable for the study (George & Mallery, 2003). Findings from the pre-test were applied to modify and improve upon the questionnaire.

Data Analysis

The SPSS version 21 for Windows software was used for the data entry and subsequent analysis. SPSS was used to perform

the descriptive statistics and describe the characteristics of the different variables that is distribution, central tendency and dispersion of each of the variables. Chi^2 test was used to test for associations.

Ethical Consideration: The research protocol was approved by the Ethical Review Board of the Cross River State, Ministry of Health. The approval was communicated in a letter referenced CRS/MH/CGS/E-H/018/Vol. II/122. Administrative permit was also obtained from the Calabar study setting Local Government Councils. Permission was sought and obtained from the school principals of each of the selected secondary school included on the study. Informed consent was obtained from the parents of the students and the students. The purpose of the research was explained to the students and they were duly assured of anonymity.

RESULTS

Out of the 1200 questionnaire distributed to the respondents' in the exploratory, pre-intervention phase only 1006 were satisfactorily completed and eligible for analysis; giving a response rate of 83.8%. Results of the analysis showed that of the 1006 respondents, 600 (59.6%) were urban based while 406 (40.4%) were rural based. 556 (55.3%) of the respondents were from public schools while 450 (44.7%) were from private schools (Fig.1).

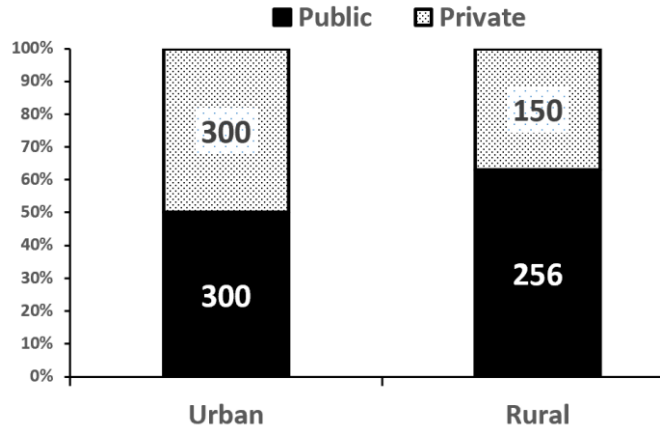

Figure 1
Baseline distribution of respondents by location and ownership of schools

As shown in Table 1, the overall mean age (SD) of the respondents was 14.4 (± 1.8), urban was 14.5±1.73, rural was 14.2±1.9 with a range of 9 to 19. The overall mean age (SD) at menarche was 12.2(±1.3). Location wise, the age (SD) at menarche in urban schools was 12.2(±1.3) while that of rural schools was 12.1 (±1.3).

As shown in Fig. 2 majority of the respondents 475 (79.16%) in urban schools knew a great deal about menstruation compared with 248 (61.08%) of their counterparts in rural schools. 68 respondents (16.74%) in rural schools knew nothing at all about menstruation compared with 20 (4.0%) respondents in urban secondary schools. A similar pattern was observed in respect of awareness of menstrual hygiene (Fig. 3.)

As shown in Fig.4 and Table 2, majority 435 (72.5%) in urban schools and 327 (80.5%) in rural schools obtained information about menstruation from their mothers. This was followed by teachers, counselors and guardians; 99 (16.5%) in urban schools and 53 (13.1%) in rural schools. Other sources of information were elder sisters/ other relations, friends, fathers, the media and NGOs or through workshops. Similarly, 407 (67.8%) in urban schools and 318 (78.3%) from rural schools were informed about menstrual hygiene by their mothers.

Table 1.
Baseline characteristics of the respondents

Characteristic	Urban	Rural	Total
Age of respondents, mean (±SD)	14.5 (±1.7)	14.2 (±1.9)	14.4 (±1.8)
Age at menarche, mean (±SD)	12.2 (±1.3)	12.1 (1.3)	12.2 (±1.3)
Level of study of respondents, Number (%)			
Junior Secondary (JSS) 3	157 (26.2%)	191 (53.7%)	348 (36.4%)
Senior Secondary (SSS)1	211 (35.2%)	68 (19.1%)	279 (29.2%)
Senior Secondary (SSS)2	177 (29.5%)	81 (22.8%)	256 (27.0%)
Distribution of respondents by location, Number (%)	600 (59.6%)	406 (40.4%)	1006 (100%)

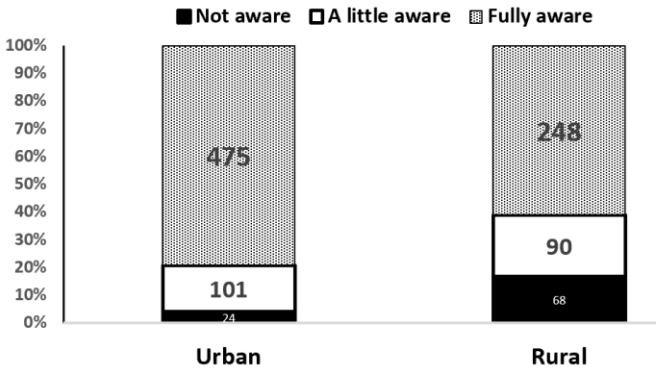

Figure 2.
Distribution of respondents by location and awareness of menstruation

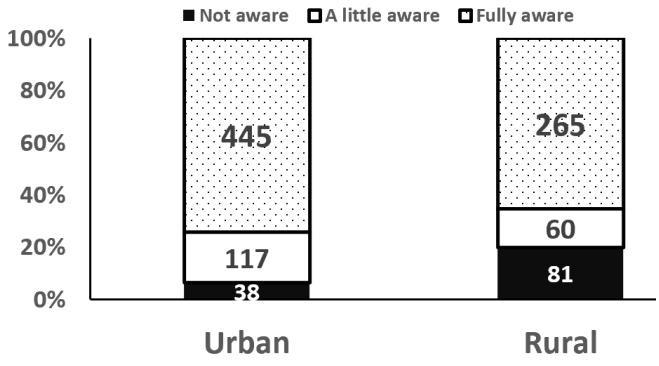

Figure 3.
Distribution of respondents by location and awreness of menstrual hygiene

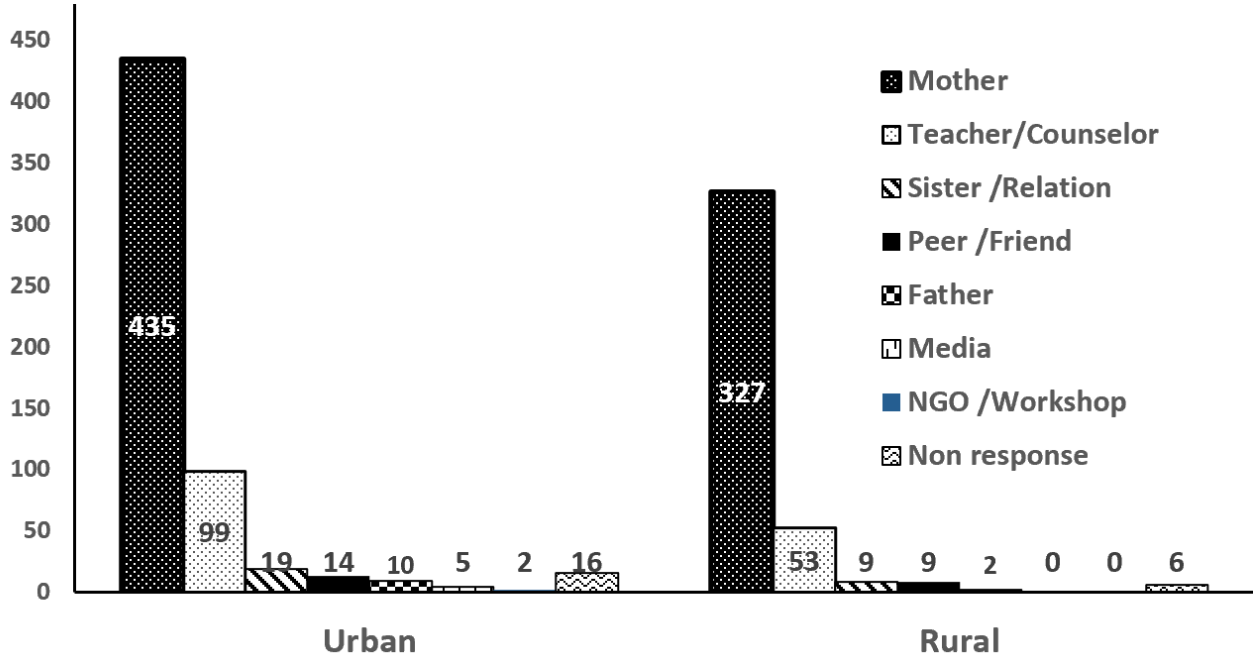

Figure 4.
Distribution of respondents by sources of information on menstruation

Table 2.
Distribution of respondents by sources of information on menstrual hygiene

Sources of information	Location					
	Urban		Rural		TOTAL	
	No	%	No	%	No	%
Mother	407	67.8	318	78.3	725	72.1
Teacher / Counselor/ Guardian	114	19.0	56	3.8	170	16.9
Elder Sister/Other relations	26	4.3	15	3.7	41	4.1
Peer /Friend	18	3.0	9	2.2	27	2.7
Father	8	1.3	1	.2	9	0.9
Radio/TV/Newspaper	5	0.8	0	0.0	5	0.5
NGOs /Workshops	5	0.8	0	.0	5	0.5
No response	17	2.8	7	1.7	24	2.4

Table 3 shows that respondents from urban schools had a statistically significant higher knowledge-base of menstruation and menstrual hygiene compared with respondents from rural schools (p= 0.000).

Table 3.
Distribution of respondents by knowledge base of menstruation by location

Knowledge base variables	Location					
	Urban		Rural		Total	
	No	%	No	%	No	%
Taught about menstruation at home	494	82.3	284	70.0	778	77.3
Taught about menstrual hygiene at home	483	80.5	277	68.2	760	75.5
Taught about menstruation at school	580	96.7	323	79.6	903	89.8
Taught about menstrual hygiene at school	578	96.3	325	80.0	903	89.8

Table 4. shows that respondents from rural schools had a significantly poor level of knowledge of menstruation and menstrual hygiene compared with respondents from urban schools (p= 0.000). Pearson Chi-Square analysis indicates that a higher proportion of respondents whose mother had high education knew a great deal more about menstruation and menstrual hygiene compared with respondents whose mother had a lower education, $\chi 2$ (2) = 53.705, p = .001; $\chi 2$ (2) = 53.895, p = .001. The effect size was 0.231 and 0.230 respectively (Table 5).

Table 4:
Distribution of respondents by level of knowledge of menstrual hygiene by location

Knowledge level	Location					
	Urban		Rural		TOTAL	
	No	%	No	%	No	%
Good knowledge	347	57.8	176	43.3	523	52.0
Poor knowledge	253	42.2	230	56.7	483	48.0

DISCUSSION

The mean age of 14.4 years with a range of 10 (9 to 19) years found among respondents in this study is lower than the 20.1 years obtained in a similar study among adolescents in Port Harcourt, Rivers State (Otobo *et al*, 2018) as well as the 16.75 years obtained in a study on Menstrual Health at Sokoto, located in the North Western part of Nigeria (Oche *et al*, 2012). The mean age is however consistent with the mean age of 14.2 years and 14-16 years age range obtained in two Ile-Ife studies among adolescents in the South Western part of Nigeria (Abioye –Kuteyi, 1997; Ojeleye, *et al*, 2016).

Table 5:
Chi-Square analysis of the relationship between Mothers' level of Education and level of awareness of menstruation and menstrual hygiene

Level of Awareness of Menstruation							**Total**		**df**	**X^2**	**P Value**
	Nothing at all		**A little some**		**A great deal**						
	No	%	No	%	No	%	No	%			
Low Education	33	3.3	175	17.4	347	34.5	555	55.2	2	53.705	0.001*
High Education	10	1.1	65	6.5	376	37.4	451	44.8			
Total	43	4.3	240	23.9	723	71.9	1006	100			
Educational Level	**Level of Awareness of Menstrual Hygiene**										
Low Education	98	9.7	113	11.2	344	34.2	555	55.2	2	53.895	0.001*
High Education	21	2.1	64	6.4	366	36.4	451	44.8			
Total	119	11.8	177	17.6	710	70.6	1006	100			

It is also within the age range of 15 – 20 years found in the Sokoto study while at same time within the age range of 13 (13- 26) years obtained among school girls in Fiji, Solomon Islands and Papua New Guinea (Mohamed *et al*, 2018).. The implication of this is that most of the respondents are in their middle adolescence stage which is approximately age 14-16 years, a period during which physical changes continue to occur in the adolescent (Kaplan, 2000).

Menarche is the start of menstruation, which is associated with physical, physiological and mental changes which take place at puberty at the beginning of adolescence. It usually takes place any time between the ages of 9 to 17 years (Otobo *et al*, 2018). In this study the mean age of menarche for rural students was 12.1 years, for urban students it was 12.2 years while overall it was 12.2 years with a range of 9 (8 to 17).

The findings in this study are similar to the mean age of menarche obtained during the pilot study which was 12.05 years for urban and 12.65 years for rural (Edet *et al*, 2017). It is comparable to the mean menarche age found among the Yoruba adolescents (Otobo *et al*, 2018) but lower than that of the Hausas, Igbos and Engenni tribes in Nigeria (Otobo *et al*, 2018). The age is firmly located within the expected range of 7 – 17 years among adolescents (Otobo *et al*, 2018). It is also consistent with the age of menarche reported in many countries globally such as Italy, India, Greece, Hong Kong, Thailand, USA, France, Japan but lower than that reported in literature by Cameroon, South Africa, Denmark, UK and Belgium (Otobo *et al*, 2018; Eveleth & Tanner, 1990; Marshal & Tanner in Falker & Tanner,1996).. Various factors have been attributed to variations in the age of menarche such as geographical region, race, ethnicity, nutritional status and socio-economic factors. The finding implies that most of the adolescents in Calabar and Akpabuyo Local Government Areas start menstruating during the early adolescent stage which may be attributable to improved diet.

The findings of this study showed that mothers play key roles in providing information about menstruation and menstrual hygiene practices to their female children. Incidentally 327 (80.5%) of the students in rural schools obtained information about menstruation from their mothers compared with 435 (72.5%) students in urban schools. Similarly, 318 (78.3%) from rural schools and 407 (67.8%) in urban schools were informed about menstrual hygiene by their mothers. The result indicates that the mother-to-daughter communication about menstruation and menstrual hygiene was higher among rural mothers compared to urban mothers. Ninety-nine respondents (16.5%) in urban schools acknowledged the role of teachers, counselors and guardians in providing information to them about menstruation while 53 (13.1%) indicated that their teachers' played a similar role in rural schools. With regards to the provision of information on menstrual hygiene management, 114 (19.0%) respondents in urban schools affirmed the role of their teachers compared to 56 (3.8%) of respondents in rural schools.

In a study conducted among 400 adolescent school girls in Kano by Lawan *et al* (2010) in Northern Nigeria, majority, 136 (35.3%) first heard of menstruation and/or menstrual hygiene from their parents; (21.5%), got the information from their sisters, 20% of the students got the information from their friends (both at home and at school), while 14.3% of the respondents learnt about menstruation and menstrual hygiene practices from their school teachers and matrons.

The findings of a similar school-based study by Ilo *et al* (2016) conducted in Abakiliki, Ebonyi State, Nigeria among 1200 adolescent secondary school girls, showed that 801 respondents (67.3%) obtained their menstrual hygiene information from friends and peers, 450 respondents (37.8%) got their information from family members (parents, sisters), while 427 (35.9%) were informed by their teachers (Ilo *et al*, 2016).

In this study, the assessment of the knowledge-base of the students about menstruation and menstrual hygiene showed that there was a significant differential knowledge about menstruation and menstrual hygiene practices between students in urban school vis-à-vis their counterparts from rural schools. 347 girls (57.8%) from urban schools had good knowledge, while 253 (42.2%) had poor knowledge compared with 176 (43.3%) in rural schools that had good knowledge and 230 (56.7%) with poor menstrual hygiene knowledge.

Secondly, respondents from urban schools had a significantly higher knowledge-base of menstruation and menstrual hygiene compared with respondents from rural schools (p= 0.001). With regards to the actual knowledge about menstrual that was taught at home was 483 (80.5%) for

urban students while the rural-based students recorded 277 (68.2%). The result also showed that in the assessment of the knowledge-base about menstrual hygiene practices that was taught at school, the urban-based schools recorded 578 (96.3%), while the rural 325 (80.0%).

The study has brought to the fore the gap in the knowledge of menstruation and menstrual hygiene between the selected rural and urban schools. This calls for a health education intervention to bridge this gap and provide the necessary information to the students in all the schools where the gaps in requisite knowledge have been identified.

In conclusion, the significant findings reflect the important role of parents as primary educators in providing basic information and health education about menstruation and menstrual hygiene knowledge to their wards at home. It also demonstrates the important complementary role that school health educators and matrons within the formal school system can play in reinforcing the knowledge provided at home about menstrual hygiene

Acknowledgement: *This study was funded by Tertiary Education Trust Fund (TETFUND), Abuja, Nigeria.*

REFERENCES

Abioye –Kuteyi, E.A., Ojofetimi, E.O., Anina, O.I., Kio, F., Ahiko, Y. & Mosuro, O (1997). The influence of socio-economic and nutritional status on menarche in Nigeria schools girls. *Nutria health*,11, 186-95.

Ayele, E., & Berhan, Y. (2013). Age at menarche among in-school adolescents in Sawla Town, South Ethiopia. *Ethiopian journal of health sciences*, *23*(3), 189-200.

Bata, M. S. (2012). Age at menarche, menstrual patterns, and menstrual characteristics in Jordanian adolescent girls. *International Journal of Gynecology & Obstetrics*, *119*(3), 281-283.

Bhartiya, A. (2013). Menstruation, religion and society. *International Journal of Social Science and Humanity*, *3*(6), 523.

Cochran, W.G. (1963). Sampling Techniques (2 ed). John Wiley & Sons

Cross River Online, 2020. Cross River Population: Calabar [24-04-2020]. Retrieved from: http://population.city/nigeria/adm/cross-river/

Diorgu, F.C. & Diorgu, A.O. (2019). Practices of Menstrual Sanitary Care among Post Primary School Girls in Nigeria. *Research in Health Science*, 4(2).

Edet, O.B., Bassey, P.E., Esienumoh, E.E. (2017). Menstrual Hygiene Practices among in-school adolescents in Urban and Rural secondary schools in Cross River State, Nigeria: A pilot study. ICM 31st Triennial Congress; 18th – 22nd June, 2017; Toronto, Canada.

Eveleth, P. B., & Tanner, J. M. (1990). Rate of maturation: population differences in skeletal, dental and pubertal development. *Worldwide variation in human growth*.

George, D., & Mallery, M. (2003). Using SPSS for Windows step by step: a simple guide and reference.

Hamal, M., & Susma, K. (2014). Hygiene, health problems and socio-cultural practices: what school girls do during menstruation. *Age*, *12*(13), 14.

Hawthorne, D. J. (2002). Symbols of menarche identified by African American females. *Western Journal of nursing research*, *24*(5), 484-501.

Heinisch, O. (1965). Cochran, WG: Sampling Techniques, 2. Aufl. John Wiley and Sons, New York, London 1963. Preis s. *Biometrische Zeitschrift*, *7*(3), 203-203.

Ilo, C. I., Nwimo, I. O., & Onwunaka, C. (2016). Menstrual Hygiene Practices and Sources of Menstrual Hygiene Information among Adolescent Secondary School Girls in Abakaliki Education Zone of Ebonyi State. *Journal of Education and Practice*, *7*(31), 88-95.

Kaplan, P.S. (2000). A child's odyssey: Child and adolescent development: Wadsworth/Thomson Learning.

Keller. S.P., Kelvin, E.A. & Munro, B.H. (2012). Munro's Statistical methods for healthcare research. 6 ed. Philadelphia, PA: Walters Kluwer Health/Lippincott Williams & Wilkins.

Kumar A, & Srivastava K. (2011). Cultural and Social Practices Regarding Menstruation among Adolescent Girls. *Social Work in Public Health*, 6, 594-604.

Marshal, W.A. & Tanner, T. M. (1996). In: Falker, F. & Tanner, J.M. (Ed). Human growth a comprehensive treatise (2 ed.). New York plenum Press: Plenum Press; 1996. p. 1-209.

Mohamed, Y., Durrant, K., Huggett, C., Davis, J., Macintyre, A., Menu, S., ... & McSkimming, D. (2018). A qualitative exploration of menstruation-related restrictive practices in Fiji, Solomon Islands and Papua New Guinea. *PloS one*, *13*(12).

Oche, M. O., Umar, A. S., Gana, G. J., & Ango, J. T. (2012). Menstrual health: the unmet needs of adolescent girls' in Sokoto, Nigeria. *Sci Res Essays*, *7*(3), 410-8.

Ojeleye, O.A., Oyeleye, B.A. & Ofi, A.B. (2016). Pattern and Extent of Self-Medication Practice among In-School Adolescents in Ile-Ife, Osun State: Implication for Nursing. *Lagos State University (LASU) Journal of Medical Sciences*, 1(1), 58-62.

Omran, A, Al Hafez G. (2006). Health education for adolescent girls: WHO Regional Office for the Eastern Mediterranean; 2006 [10/11/2020]. Retrieved from: http://www.emro.who.int/dsaf/dsa722.pdf.

Otobo, T.M., Paul, J. N., Isikaku, O.O. (2018). Age at Menarche in Nigerian Adolescent Girls Case Study:(Igbo, Yoruba, Hausa and Engenni Tribes of Nigeria). *European Journal Of Pharmaceutical and Medical Research*, 5(9), 152-60.

Parent, A. S., Teilmann, G., Juul, A., Skakkebaek, N. E., Toppari, J., & Bourguignon, J. P. (2003). The timing of normal puberty and the age limits of sexual precocity: variations around the world, secular trends, and changes after migration. *Endocrine reviews*, *24*(5), 668-693.

Ulijaszek, S. J., Evans, E., & Miller, D. S. (1991). Age at menarche of European, Afro-Caribbean and Indo-Pakistani schoolgirls living in London. *Annals of human biology*, *18*(2), 167-175.

Lawn, U.M., Yusuf, M. W., & Musa, A. B. (2010). Menstruation and menstrual hygiene amongst adolescent school girls in Kano, Northwestern Nigeria. *African journal of reproductive health*, *14*(3), 201-207.

Yermachenko, A., & Dvornyk, V. (2014). Nongenetic determinants of age at menarche: a systematic review. *BioMed research international*, *2014*.