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Assessment of Students' Understanding of Menstrual Cycle in Navakholo Sub-County, Kakamega County, Kenya

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Abstract

Cultural practices and myths around menstruation undermine the scientific conception of this aspect concept among learners in Africa. Distorted understanding of menstrual cycle hinders the development of the appropriate life-skills with regard to human sexuality, as evidenced by the prevalence of teenage pregnancy among Kenyan youths. This paper assesses students' understanding of menstrual cycle in Navakholo sub-county, Kakamega County, Kenya. A case study design was used to collect quantitative and qualitative data from 82 students aged between 13 and 19 years in two secondary schools. Questionnaire, Focus Group Discussions and Key Informant Interviews Guides were used to collect data. The findings indicated that majority of the students (74.4%) had basic understanding while 21 (25.6%) students achieved intermediate understanding. None of the students achieved full comprehensive understanding of menstrual cycle. Their understanding was distorted by cultural knowledge about menstruation.

Keywords: School science, culture, students' understanding of menstrual cycle

1. Background

The key argument in this paper is that distorted scientific understanding is a phenomenon that

can influence the preparedness of adolescents in managing biological changes in their lives such as their sexual and reproductive health (Raya, Depok and Yogyakarta, 2013). One of the negative consequences for mismanaging human sexual and reproductive health is the entry into early, unplanned parentage. This further leads to negative social consequences such as young girls dropping out of school and possibly living in poverty in their adulthood (Mumah et al., 2014).

One of the factors that can control this problem is the management of female reproduction health as characterized by menstrual cycle (Popular Science, 2014; Rajak, 2015). It was therefore, necessary to establish how Kenyan school going youths understand menstruation in an effort to contribute to the preparation of youths in managing their sexuality.

The Adolescent Sexual and Reproductive Health (ASRH) plays a significant role in the lifelong human health and well-being (Kenya Demographic and Health Survey 2014). Results from Kenya' s Demographic and Health Survey (2014) recommended that even though facets of adolescent sexual and reproductive health in Kenya (ASRH) were improving, areas such as teenage pregnancy needed more attention due to its persistent prevalence. For example, Population Reference Bureau (PRB) (2015) in their report on adolescent sexual and reproductive health in Kenya stated that 18 percent of teenage girls between the ages of 15 and 19 years were mothers.

This report further noted that although steps had been taken to reduce teenage childbearing in many parts of the country, in some parts it had remained constant. For example in Nyanza region 21 percent of teenage girls aged 15 to 19 years were already mothers in 2003 whereas in 2014, the rate was 19 percent (PRB 2015). The persistence of teenage pregnancy among youths tends to work against millennium development goals such as the need to empower women through education. In case of pregnancy, it is the girl child whose education is most adversely affected (Mumah et al., 2014).

A number of approaches have been tried in preventing teenage pregnancy. Pastoral care and counseling in religious institutions and schools (Abdelmoty et al. 2015, Ministry of Education 2014 & 2016; Nyamosi 2015). Cultural education by more experienced members of the community such as grandmothers and aunts has not yielded improved rates in the prevention of teenage pregnancy (Raya et al., 2013; Tarhane and Kasulkar; 2015).

Nevertheless, it is expected that with the appropriate scientific conception of the nature human reproduction, children will convert this knowledge into life skills to manage their own sexuality (Popular Science, 2014; Rajak, 2015; Koff et al., 2008; Partners in Sexual Health, 2013; Mataboge, Beukes, and Nolte, 2014; Population Reference Bureau, 2015). Furthermore, Ehlers (2003) demonstrated that adolescent pregnancy was considered to be, in part a result of limited education regarding contraception, human science and more so menstrual cycle which is one of the methods of natural childbirth control by being aware of safe days within the cycle. Ehlers (2003) concluded that community and the whole world must accept young people as reproductive beings and endeavor to provide for the controls of underage pregnancy, by presenting females with knowledge and decision-making skills, whether they are sexually active or not.

The Kenya government has tried to address this matter by incorporating human reproduction science in the school system ((Nyamosi et al., 2015, Ministry of Education, 2014). In Kenyan primary school curriculum teachers teach science of human reproductive system, the functions of the parts of the reproductive system and physical changes in both girls and boys in the 6th grade. However, the concept of menstrual cycle is only mentioned without further explanation of its scientific basis (Nyamosi et al., 2015). At the secondary school level menstrual cycle is taught in Biology in the 11th grade (Ministry of Education 2016). Yet the Biology textbook for Grade 11 discusses menstrual cycle in details especially the phases of the menstrual cycle, hormones and secondary sexual characteristics in both males and females, but it does not link the menstrual cycle to conception and does not emphasizes on the mastery of the menstrual cycle events in order to prevent teenage pregnancy (Ministry of Education 2016).

The disjointed presentation of this concept as exhibited in school science textbooks, coupled with traditional and religious representation of the nature of menstruation cycle is likely to lead to distorted conception among learners. This can be supported by the constructivist theory' s position on learning that knowledge acquisition is a process by which a learner constructs mental representations of the reality that they discover around them (Piaget, 1952/1989). In science learning however, if the concept is not appropriately presented by the teacher and the learning resources the kind of conception a learner acquires from classroom learning is a function of both cultural knowledge and the school science perspectives leading to a distorted understanding of same phenomenon (Mortimer and Scott, 2003). This study therefore, intended to establish whether children actually have a scientific conception of menstrual cycle in Navakholo sub-county, Kakamega County, Kenya.

2. Method

A case study design is an in-depth assessment of a phenomenon as described by (Njenga & Kabiru, 2009). Several methods are used such as published biographical materials, observation, clinical interviews, tests and achievement tests to collect data (Njenga & Kabiru, 2009). As for this study the researcher used a multiple choice questionnaire based on current school curriculum especially primary and secondary school curriculum as an example of achievement test. Case study design provided in depth information and the results could be fairly accurate if the observations and other data collection methods are carried out appropriately (Mugenda & Mugenda, 2003).

2.1 Population

The target population of this study was students aged between thirteen (13) and nineteen (19) years from two public mixed secondary schools in Navakholo Sub County Kakamega County. There were a total of seven hundred and twenty six (726) students of both genders in the two schools.

2.2 Sample Size

A total of eighty three (83) students was sampled. In addition four focus group discussions (FGD) of eight members of equal number of students from each class from form one to four were conducted having two FGDs in every school. Key informant interviews (KI) were also

conducted with the two (2) principals and two (2) deputy principals of the two schools bringing the number to four key informants. A total of eighty seven (87) participants formed the sample size.

2.3 Sampling Procedure

Stratified random sampling school-based technique was used to select the required sample. A representative sample of about forty two students was selected in which five male and five female students from each class from form one to four in each of the secondary schools. A total sample size of eighty three students did the multiple-choice questions. In addition, the focus group discussions (FGD) of eight members of equal number of students from each class from form one to four were conducted. There were two focus groups per school comprising of male and female students. Key informants (KI) interviews were also conducted with the principals and deputy principals of the two schools. The groups were chosen after consultations between the researcher and teachers.

2.4 Instruments

The researcher used three research instruments namely, Key Informant Interviews Guides for interviews with the principal and deputy principals of the selected schools, Focus Group Discussion Guide for focus group discussions of various groups i.e. Male students and female students and finally, a structured multiple-choice questionnaire, which derived from the content of Kenyan school science curriculum, was administered to both male and female students so as to establish their scientific understanding of menstrual cycle. Section A was used to acquire information on the background of the participants and section B covered information associated to the objectives. All the tools were refined and adopted following extensive pre-testing with students.

2.5 Data Collection

In order to observe ethical and cultural sensitivities that are attached to sexuality, female researcher assistants conducted questionnaires and FGDs with female students while male researcher assistants conducted the FGDs with male students. Notes were taken throughout discussions by a trained male note-taker who was seated within circle of male and a female one for the female students. Electronic recording of minors was not permitted because it required special security clearance beyond the authority of the schools' management. It was an impromptu requirement which was raised by the schools' authorities while the participants had already been assembled for the discussion.

2.6 Data Analysis

The scientific understanding of students was evaluated by use of a multiple choice questionnaire whose focus was on getting the respondents' understanding of the major terms in the concept of menstrual cycle. Binary method of scoring was used in that respondents were scored on a scale of one (1) for a correct response and a zero (0) for wrong response. The level of understanding was based on the premise that people have different understanding at different ages, genders and different levels of education which is well demonstrated through

Kenyan education system that is primary school, secondary school and college or university.

The above method of scoring resulted in different categories of understanding that is Basic Understanding, Intermediate Understanding and Full Comprehensive Understanding of menstrual cycle. These levels were differentiated by scoring a point for the various components that constitute the scientific conception of menstrual cycle as illustrated below.

2.6.1 Basic Understanding of Menstrual Cycle

This is the most basic category of understanding expected of elementary school pupils. It involves knowledge on the female reproduction system, parts of female reproductive system and some knowledge on definition of menstrual cycle (Nyamosi et al., 2015, Ministry of Education 2014). It comprised of fourteen (14) terms in whose scores were further grouped into four subcategories as follows. A score of "0" meant no understanding; 1-5 meant the respondents had acquired at least one to five terms which corresponded to a sub-category of "basic simple understanding".A score of at least 6-10 meant respondents had achieved "intermediate basic understanding" and 11-15 terms meant the respondents had achieved "basic comprehensive understanding."

The participants mentioned monthly cycle, changes in the ovaries, changes in the lining of the uterus and the shedding of the endometrium got one (1) score for every term mentioned correctly. The respondents were asked to name the diagram of female reproductive system and identify its parts in which they scored one (1) point for every correct answer but scored zero (0) for wrong answers as follows: female reproductive system (1) as well as its parts such as Vagina (1), cervix (1), myometrium (1), uterus (1), fallopian tubes (1), fimbriae (1), ovary (1) and endometrium (1). Finally they were asked to state the scientific term for the onset of menstruation, i.e., menarche (1).

2.6.2 Intermediate Understanding of Menstrual Cycle

This category of understanding expected of secondary schools students where female reproduction system, parts of female reproductive system, definition of menstrual cycle and phases of the menstrual cycle and basic hormones that control menstrual cycle are taught. Menstrual cycle is covered as from form three in detailIt comprises twenty (20) aspects of the scientific conception of menstrual cycle. There were four subcategories of understanding where having knowledge of at least 1-5 terms represented "No Understanding", 6-10 terms for – "Intermediate Basic Understanding", 11-15 terms represented "Intermediate Understanding" and getting at least 16-20 terms right stood for "Intermediate Comprehensive Understanding."

Every correct aspect of the concept was scored as one (1). Foe example, the participants were asked to define menstrual cycle and those who mentioned monthly cycle, changes in the ovaries, changes in the lining of the uterus and the shedding of the endometrium got one (1) score for every term mentioned correctly. The respondents were asked to name the diagram of female reproductive system and identify its parts in which they scored again one (1) point for every correct answer but scored zero (0) for wrong answers as follows: female reproductive system (1), its parts as Vagina (1), cervix (1), myometrium (1), uterus (1), fallopian tubes (1), fimbriae (1), ovary (1) and endometrium (1). Finally they were asked to state how the start of

menstruation is referred to as menarche (1). The respondents were asked the number of phases (1) in the menstrual cycle and the average length of menstrual cycle (1). The phases of menstrual cycle are: menstruation (1), follicular (1), ovulation (1) and luteal (1).

2.6.3 Full Comprehensive Understanding of Menstrual Cycle

Full comprehensive understanding comprised a scientific conception of menstrual cycle. The respondents therefore, understand the correct scientific description of menstrual cycle, phases and the relationship with the hormones controlling female reproductive system.

The participants were asked to define menstrual cycle and those who mentioned monthly cycle, changes in the ovaries, changes in the lining of the uterus and the shedding of the endometrium got one (1) score for every term mentioned correctly. They were further to identify parts of the female reproductive system presented in a diagram. They scored again one (1) point for every correct answer and scored zero (0) for wrong answers as follows: female reproductive system (1), its parts as Vagina (1), cervix (1), myometrium (1), uterus (1), fallopian tubes (1), fimbriae (1), ovary (1) and endometrium (1). Finally they were asked to state how the start of menstruation is referred to as menarche (1). The respondents were asked the number of phases (1) in the menstrual cycle and the average length of menstrual cycle (1). The phases of menstrual cycle are: menstruation (1), follicular (1), ovulation (1) and luteal (1). The respondents name and give the functions of the hormones that control menstrual cycle. The hormones were considered to be estrogen (1), progesterone (1), luteinizing (1) and follicle stimulating (1)

2.7 Ethical Consideration

The researcher obtained permission to conduct the study from the University of Nairobi department of psychology through an authorization letter. A research permit from the National Council of Science and Technology and Innovation was also requested by the researcher. Thereafter, the researcher visited the two schools to request the schools' boards of management and head teachers to be allowed to carry out the study. The researcher explained the aim of the study to the respondents. The fact that participation was voluntary the respondents were free to withdraw whenever they deemed fit and that confidentiality and privacy was upheld. Informed consent was sought from the respondents to ensure voluntary participation. The research findings were disseminated responsibly. Confidentiality was assured as the questionnaires were self-administered without writing respondents names (identity). School principals provided verbal consent for their schools to participate. No personal identifying details were recorded on questionnaires or interview notes.

3. Results

3.1 Demographic Characteristics

A total of 83 respondents completed the self-administered multiple choice questionnaire. Of these 82 were students of both genders in a ratio of 1:1 from form one to four. (50%) were females while the other 50% were males and 90% of the girls had reached menarche. The general scientific performance of the students was reported as $\overline{X}$= 20± (4.713) ranging from 12

to 33 with an F= 33.182, P = 0.001.

3.2 Students' Sources of Information Regarding Menstrual Cycle

The first objective was to establish students' sources of information which was presented to the 82 student respondents and according to the data collected only 40 among the 82 students of both genders answered it. Of the 41 (50%) who answered the question 15 (71.4%) stated that their most common source of information was school or teachers followed by television at 7 (33.3%) then health worker with 4 (19.0%) of the respondents followed by family member for example mother and siblings (sister), friends and peers, movies cinemas and leaflets at 3 (14.3%) each. The least common source of information was banners and posters at 2 (9.5%) and none of the respondents mentioned church as a source of information. The above observation about the church could be due to religious taboos and beliefs about menstruating women which corresponded to Bhartiya' s (2013) study in which she reported that menstruating women were not allowed to attend church services, meet men or prepare fresh foods and that menstruating women were secluded in special huts in Russia among Orthodox Christian. While participants were agreeing with Bhartiya (2013) they had the following to say during focus group discussions which makes the church not a source of information among students because they are stigmatized.

> *Male respondent: Blue "churches view menstruating women as normal beings, but don't allow them to conduct service".*
> *Male respondent: Green "church view menstruating women as unclean and therefore unfit to participate in religious activities"*
> *Key informant: 1 "menstruating women should not play public duties especially church duties".*

Contrary to McMahon' s et al., (2011) study where the findings showed that teachers and mothers felt uneasy talking about menstruation, in this study teachers were the most common sources of information among students and mothers' also to some extent being source of information to about 14.3%. These study findings on the teachers being the main source of information agrees with APHRC (2010) who found out that girls felt teachers were supportive by informing them about menstrual cycle.

3.3 Students' Basic Understanding of Menstrual Cycle

According to the study as presented in Table 1 and figure 1 below, 70 (85.4%) had a basic intermediate understanding, followed by 7 less than 10% (8.5%), with basic comprehensive understanding and 5 (6.1%) basic simple understanding with none of the students having No understanding of the female reproductive system and the definition of menstrual cycle. Also, during the focus group discussion, the students through their responses could not describe menstrual cycle and relate to the phases of the menstrual cycle when they were asked about the most fertile period a woman can get pregnant as demonstrated in their sentiments below:

Table 1. Students' basic understanding of menstrual cycle

Variable	Percent (%)	Freq. (n)
No understanding	0.0	0
Basic Simple Understanding	6.1	5
Basic Intermediate understanding	85.4	70
Basic Comprehensive understanding	8.5	7

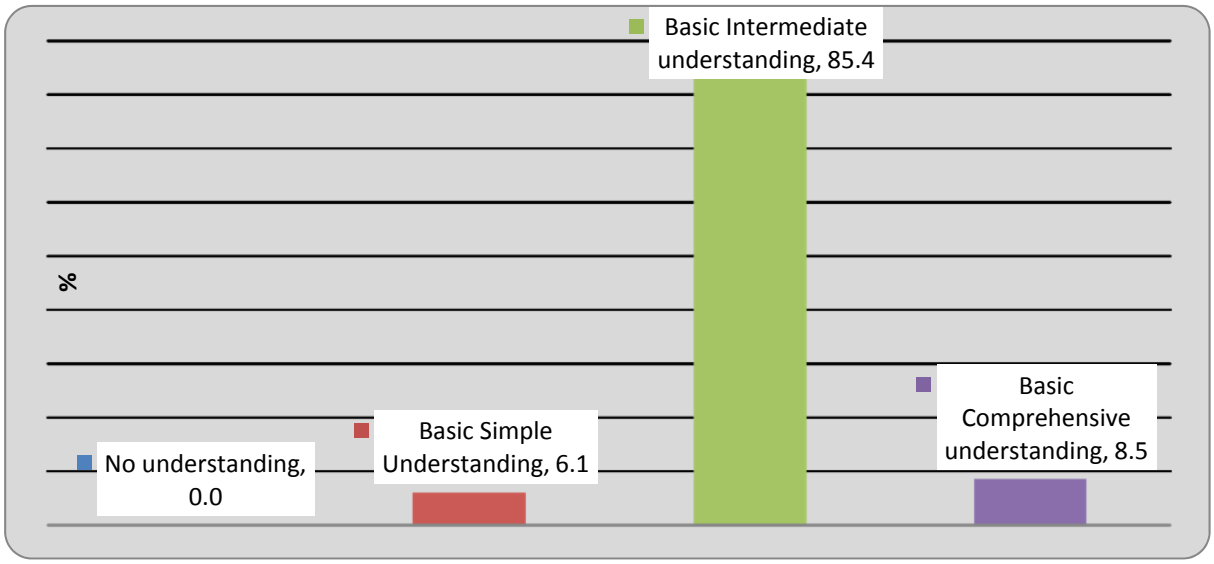

Figure 1. Students' basic understanding of menstrual cycle

Female Red: Is a process by which girls see blood coming out within time as they develop growth.

Male Blue: It is the periodic discharge of unfertilized ovum from females.

Female Green: Is a period of which the ovum breaks and comes out in form of blood.

Female purple: most fertile period is between 7-14 days

Male Green: most fertile period is thirty and above

Students' Intermediate understanding of menstrual cycle

As presented in Table 2 and figure 2 below, most of the students (58.5%) had intermediate basic understanding, followed by 41.5% intermediate understanding and none with intermediate comprehensive understanding and no understanding of the twenty terms evaluated in the concept of menstrual cycle. As the researcher increased technical scientific

terms of the menstrual cycle in the evaluation the number of the respondents who got them right reduced and wrongs increased for example comparing basic intermediate understanding 70 (85.4%) in basic understanding and Intermediate understanding 34 (41.5%) under intermediate understanding.

Table 2. Students' intermediate understanding of menstrual cycle

Variable	Percent (%)	Freq. (n)
No understanding	0.0	0
Intermediate basic understanding	58.5	48
Intermediate understanding	41.5	34
Intermediate Comprehensive understanding	0.0	0

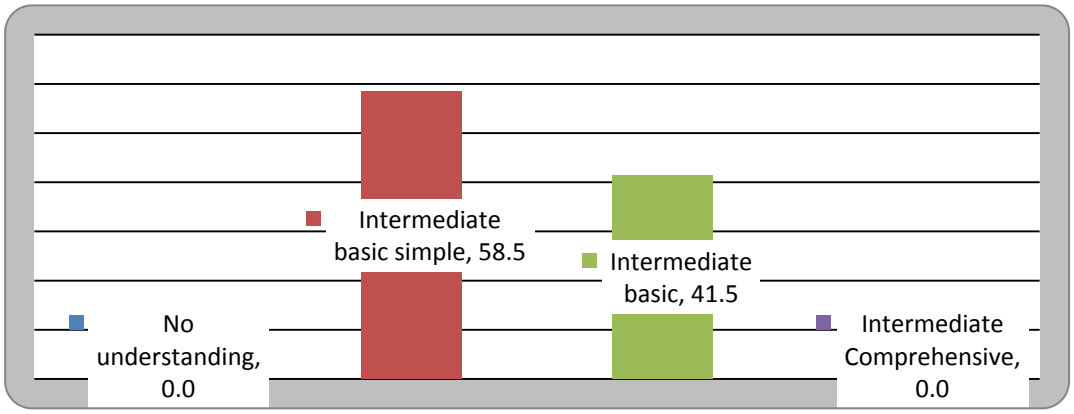

Figure 2. Students' intermediate understanding of menstrual cycle

3.4 Student' s full comprehensive understanding of menstrual cycle

None of the students had a understanding and full comprehensive understanding as displayed in Table 3 and figure 3 below, with majority of respondents that is 61 (74.4%) having full comprehensive basic understanding and 21 (25.6%) full comprehensive intermediate understanding.

Table 3: Student' s full comprehensive understanding of menstrual cycle

Variable	Freq. (n)	Percent (%)
No understanding	0	0.0
Full comprehensive basic understanding	61	74.4
Full comprehensive intermediate understanding	21	25.6
Full comprehensive understanding	0	0.0

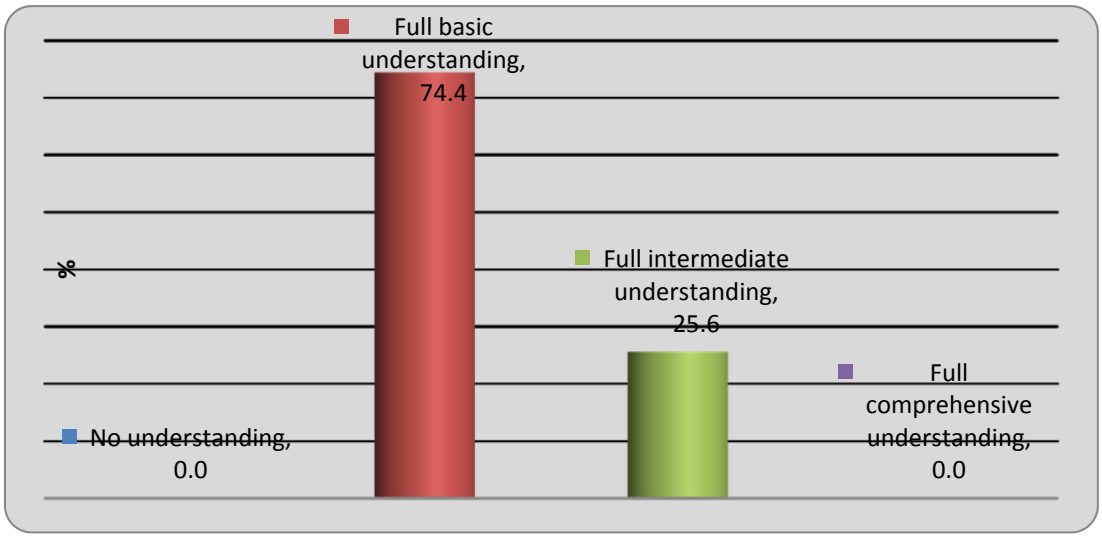

Figure 3: Student' s full comprehensive understanding of menstrual cycle

3.5 Factors influencing students' overall understanding of menstrual cycle

From the above evaluation of basic, intermediate and comprehensive understanding the researcher also assessed how Gender, age, level of education, religion and socio-economic status influenced the students' understanding of menstrual cycle. Gender with $\bar{X}$= 1.47± (0.503), F= 3.228, P =0.046, Age with $\bar{X}$= 2.98 ± (1.191), F= 4.711, P= 0.013 and Class (level of education) with $\bar{X}$= 2.59, ± (1.191), F=3.939, P= 0.025 were significant in the students' understanding of menstrual cycle having P values of less than 0.05. Whereas Religion with $\bar{X}$= 1.94± (0.244), F=0.336 P= 0.716 and socio-economic status that is mother' s and father' s employment with $\bar{X}$= 1.75± (0.436), F= 0.186 P= 0.831 and $\bar{X}$= 1.84± (0.366), F= 0.281, P=0.756 respectively were not significant with their P-values remaining higher than 0.05 used in Psychology as illustrated in table 5 below.

4. Discussions

4.1 Students' General Information on Menstrual Cycle

All the female respondents had already started menstruation which accounted to 50% of all respondents. Most of whom that is 24(29.3% students had started their period between 14 and

15 years followed by 11 to 13 years 12(14.6%) students whereas a handful 5(6.1%) students started above 15 years . On assessing whether they had received information prior to starting their period 35(42.7) students said yes while 7(8.5%) of students said no. But while evaluating if they had adequately been prepared for the first period 19(22.6%) students said yes and 23(27.4%) students said no; meaning that most of the young people are not always adequately prepared for menarche.

The findings are consistent with (Koff & Rierdan 2008; Raya et al., 2013) who observed that 97% of girls had heard of menstruation before menarche although many stated that they had not been well prepared and that they were confused when they first menstruated and lacked adequate knowledge on how to deal with menstruation. They explained that only 63% of the respondents knew what was happening when they first menstruated and only 55% felt prepared. The study findings coincided with Raina & Balodi (2014) who concluded that menstruation was a difficult subject within families, the girls in their study did not know about it when they were young until their first menses and that most of the girls were not conscious of the process of menstruation before menarche.

4.2 Students' Sources of Information

The first objective was find out the students' sources of information which was presented to the 82 student respondents and according to the data collected only 40 among the 82 students of both genders answered it. Of the 41 (50%) who answered the question their most common source of information was school or teachers 15 (71.4% followed by television at 7(33.3%), health worker 4(19.0%), family member for example mother and sister, friends and peers, cinemas and leaflets at 3(14.3%) each respectively. The least common source of information was banners and posters at 2(9.5%) whereas none of the respondents mentioned church as a source of information.

The above observation about the church could be due to religious taboos and beliefs about menstruating women which corresponds to Bhartiya' s (2013) study in which she reported that menstruating women were not allowed to attend church services, meet men or prepare fresh foods and that menstruating women were secluded in special huts in Russian among Orthodox Christian. Contrary to McMahon' s et al., (2011) where they reported that teachers and mothers felt uneasy talking about menstruation, in this study teachers were the most common sources of information among students and mothers' also being source of information.

These study findings on the teachers being the main source of information agrees with APHRC (2010) and Raya et al., (2013) who found out that girls felt teachers were supportive by informing them about menstrual cycle and that teachers were the main source of menstrual knowledge for teenage boys .

4.3 Students' Understanding of Menstrual Cycle

The students' understanding was evaluated by use of a multiple choice questionnaire and classified in three categories namely Basic, Intermediate and Comprehensive understanding based on the important terms in the concept of menstrual cycle. Menstrual cycle involved twenty four terms in which basic understanding was fourteen terms, Intermediate

understanding twenty terms and full comprehensive had twenty four terms. The terms included terms of the previous level of understanding as the evaluation progressed towards full comprehensive understanding in a graduating manner. Refer to data analysis chapter three. According to the study 70 (85.4%) of the students achieved basic intermediate understanding followed by 61(74.4% of students achieving full comprehensive basic understanding due to the effect of basic understanding terms which made up full basic comprehensive understanding. 48(58.5%) of the students achieved intermediate basic understanding with no student achieving full comprehensive understanding.

Lack of full comprehensive understanding findings corresponded with Koff and Rierdan (2008) who reported that the girls in their study could not put together the essentials into a complete one piece in their attempt to explain menstruation and menstrual cycle, whereby they concentrated on one meticulous component of the process such as ova or blood or the uterus. They asserted that the girls' information on the position and purpose of reproductive structures was defective, and most of them did not understand how they were interrelated. This was demonstrated through the multiple choices questionnaire in which some students could not label the female reproductive system diagram and could not relate the parts of the reproductive system with their functions in which only 7(8.5) students achieving basic comprehensive understanding of menstrual cycle. Similar studies conducted among young people in Uganda, Zimbabwe, Kenya, Ghana, and Tanzania had all observed uncertainty about menstrual cycle, menstruation processes and lack of practical menstrual information provided to girls pre and to some extend post menarche particularly the ones conducted by Sommer (2009) and Fehr (2011).

Again these findings were in agreement with Yip (2010) who discovered that children had difficulties in conceptualizing scientific knowledge. Raya et al., (2013) agreed with Yip (2010) that most girls and boys participating in their study had a basic understanding that menstruation occurred if an ovum was not fertilized by sperm but in-depth understanding was limited and misconceptions were common among rural girls. They said that some girls believed that menstruation was the result of fertilization of an egg or that it was controlled by ' primary cells' in a woman' s body that caused monthly bleeding.

While evaluating the factors that influence students understanding such as gender, age, level of education, religion and socio-economic status the findings demonstrated that gender, age and level of education were statistically significant (P value < 0.005) meaning they influence students' understanding of menstrual cycle. Whereas Religion and socio-economic status were not significant meaning they do not affect the students' understanding.

5. Conclusion

There were three levels of understanding that is basic, Intermediate and comprehensive understanding. As the understanding graduated from basic through intermediate to full comprehensive understanding the few the number of respondents for students who were achieving higher level of understanding. Poor understanding resulted to poor performance while full comprehensive understanding of the concept of menstrual cycle resulted to good performance, which was not achieved because none of the students demonstrated full

comprehensive understanding whose performance ranged between 12 to 33 scores all out of 50 scores. In this study students had no full comprehensive understanding of menstrual cycle leading to the discovery that the high rate of pregnancies among the young people could partly be due to their no full understanding of menstrual cycle.

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