ASSESSMENT OF STUDENTS' AND TEACHERS' UNDERSTANDING OF MENSTRUAL CYCLE IN NAVAKHOLO SUB-COUNTY, KAKAMEGA COUNTY, KENYA

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DECLARATION

This project report is my original work and has not been presented for a degree in any other university.

SIGN…… DATE ……

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C50/83996/2016

This project report has been submitted for the review with my approval as university supervisor.

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ABSTRACT

Notably, it's very rare for Men and women to freely talk about menstrual cycle and maturation of the girl child. Cultural practices, taboos and myths linked to menstruation undermine discussions about menstruation which conversely leads to several conceptions and misconceptions about menstrual cycle and its processes leading to increase in teenage pregnancy. The aim of the study was to establish students' and teachers' understanding of menstrual cycle in Navakholo sub-county, Kakamega County.

A case study design with a mixed-method research method was used combining quantitative and qualitative methods in two secondary schools in Navakholo sub-County, Kakamega County. The quantitative study was conducted among 103 students and teachers among them 82 students between 13 and 19 years and 21 teachers above 24 years of both genders by use of a multiple choice questionnaire. Six focus group discussions among school girls, boys and teachers of both genders and four Key Informant interviews were conducted in October, 2017.

The results of the findings indicated that 61 (74.4%) students and 11 (52.8%) teachers had full comprehensive basic understanding while 21 (25.6%) students and 8 (38.1) teaches had full comprehensive intermediate understanding. Only 1 (4.8) teacher had full comprehensive understanding while none of the students had full comprehensive understanding of menstrual cycle. 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 both for teachers and students who were achieving higher level of understanding. full comprehensive understanding of the concept of menstrual cycle was not achieve because only one teacher demonstrated full comprehensive understanding with none of the students achieving it.

Key word

Menstrual cycle, Students, teachers, understanding menstrual cycle knowledge

CHAPTER ONE
BACKGROUND OF THE STUDY

1.0 Introduction

Chapter one addressed the study background, statement of the problem, purpose, objectives of the study, hypotheses and research questions. Study's justification, significance, scope, limitations, delimitations and assumptions was also discussed that ascertained the grounds on which the research was carried out.

1.1 Background

Many young Kenyans, especially adolescents aged ten years to nineteen years have specific vulnerabilities that need more consideration. The Adolescent sexual and reproductive health (ASRH) plays a significant role in the lifelong health and well-being which contributes to the health of future generations (Kenya Demographic and Health Survey 2014). Teenage pregnancy has been a worldwide problem but in Kenya, it is now becoming a national disaster. Results from Kenya's Demographic and Health Survey (2014) demonstrated that facets of adolescent sexual and reproductive health in Kenya (ASRH) are improving but some areas such as teenage pregnancy needed more attention.

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. Although steps had been taken to reduce teenage childbearing in many parts of the country in some parts it had remained constant. For example 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 almost the same as in 2003 (PRB 2015).

A number of approaches have been tried in preventing teenage pregnancy. Pastoral care and counseling in religious institutions and schools (Abdelmoty et al. 2015, KBL 2016, KBL 2016 and Nyamosi 2015). Cultural education by more experienced members of the community such as grandmother and aunts has not yielded improved rates of teenage pregnancy (Raya et al 2013, Tarhane and Kasulkar2015). The government has addressed this matter by incorporating human reproduction science in the school system ((Nyamosi et al 2015, KBL 2014). It is expected with the

appropriate conception of human reproduction; children will convert this knowledge into life skills to manage their own sexuality (Eördögh (2014), Rajak (2015) and Koff et al (2008).

Obtaining appropriate knowledge and a comprehension of the body and its capabilities by the young people is a part of their life skills to help them prevent unwanted pregnancies as stated by (Mataboge, Beukes, and Nolte (2014).Willan (2013) concurred with (Mataboge, Beukes and Nolte 2014) that teenage pregnancy is in part caused by inappropriate knowledge about menstrual cycle and poor understanding of conception among female teenagers. Population Reference Bureau (PRB) (2015) concluded that giving information on and ways of reducing teenage pregnancy, enabling teenagers to gain age-appropriate good sexuality education and ending harmful habits that negatively impact adolescent sexual and reproductive health today can in turn result into teenagers growing up healthy, energetic and with better problem solving skills.

According to Koff et al. (2008) in their study on the understanding of Menstrual Cycle where eighty college young women were asked about their understanding of various phases of the menstrual cycle, follicular, ovulation, luteal phases, as well as menopause and menstruation. The results showed that basic understanding of the menstrual cycle, also among well-educated women, was questionable, poorly informed and generally negatively biased and that they were reflecting from the preferences and limitations of teaching curriculum and common knowledge.

In Kenya, Primary school curriculum covers science subject where teachers teach science of female reproductive system in class six in which menstrual cycle is only mentioned in passing (Nyamosi et al 2015). The secondary school curriculum covers menstrual cycle in Biology in form three according to Kenya Literature Bureau (KBL2016). KBL (2016) Biology form three book discusses menstrual cycle in details but it does not link the menstrual cycle to conception and does not emphasizes on the mastery of the cycle events in order to prevent teenage pregnancy.

A study done by Abdelmoty et al. (2015) on Menstrual variability and dysfunctions among secondary school teenagers in Egypt highlighted the need to review the school programs on menstrual educational which had conferred girls with fundamentally biological knowledge lacking more practical knowledge about the many aspects of menstruation, menstruation cycle, conception, ovulation and several coping techniques. Also Echendu (2008) demonstrated that teachers and formal education, in common, were perceived to play little function in reference to information on reproductive well-being of young people, a situation they considered worrisome given the significant role teachers play as regular instructors in the schooling of the growing children.

Ehlers (2003) agreed with Echendu (2008) where he reported that adolescent pregnancy was considered to be, in part as 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 application of safe days within it. 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.

1.2 Statement of the problem

Teenage pregnancy is becoming a national disaster. Results from Kenya's Demographic and Health Survey (2014) demonstrated that facets of adolescent sexual and reproductive health in Kenya (ASRH) are improving but some areas such as teenage pregnancy needed more attention. 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 although steps had been taken to reduce teenage childbearing in many parts of the country in some parts it had remained constant. For example 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 almost the same as in 2003 (PRB 2015).

A number of approaches have been tried in preventing teenage pregnancy. Pastoral care and counseling in religious institutions and schools (Abdelmoty et al. 2015, KBL 2016, KBL 2016 and Nyamosi 2015). Cultural education by more experienced members of the community such as grandmother and aunts has not yielded improved rates of teenage pregnancy (Raya et al 2013, Tarhane and Kasulkar2015). The government has addressed this matter by incorporating human reproduction science in the school system ((Nyamosi et al 2015, KBL 2014). It is expected with the appropriate conception of human reproduction; children will convert this knowledge into life skills to manage their own sexuality (Eördögh (2014), Rajak (2015) and Koff et al (2008).

However, the Kenya Demographic Survey (2014) has reported that teenage pregnancy is on the rise in some counties and being constant in others. In case of pregnancy, it is the girl child whose education is most adversely affected (Mumah et al 2014). This means that a proper conception of the concept of menstruation cycle can be beneficial to the girl child's management of their own sexuality and probably help the boys too in how they sexually relate to girls. This study intended to establish whether children and teachers actually have a scientific conception of human reproduction and more so menstrual cycle and its process as a whole. This study therefore assessed the students' and teachers' understanding of menstrual cycle in Navakholo sub-county, Kakamega County, Kenya.

1.3 Purpose of the study

The purpose of this study was to establish students' and teachers' understanding of menstrual cycle in Navakholo sub-county, Kakamega County, Kenya.

1.4 Main Objective

The main objective of this study was to establish the students' and teachers' understanding of menstrual cycle in Navakholo sub-County, Kakamega County, Kenya.

1.4.1 Specific objective

The specific objectives were to:

i. Determine the students' source of information about menstrual cycle.
ii. Examine the students' understanding of menstrual cycle.
iii. Find out the teachers' understanding of menstrual cycle.
iv. Investigate the correlation between the students' and the teachers' understanding of menstrual cycle.

1.5 Research questions

The research questions were;

i. What were the students' sources of information about menstrual cycle?
ii. What was the students' understanding of menstrual cycle?
iii. What was the teachers' understanding of menstrual cycle?
iv. What was the correlation between the students' and the teachers' understanding of menstrual cycle?

1.6 Research hypotheses

The research hypotheses were:

i. There was no relationship between students' understanding of menstrual cycle and their sources of information regarding menstrual cycle.
ii. There was a relationship between students' understanding of menstrual cycle and the knowledge about menstrual cycle.
iii. There was no relationship between teachers' understanding of menstrual cycle and the knowledge about menstrual cycle.
iv. There was a relationship between students' and teachers' understanding of menstrual cycle and the knowledge regarding menstrual cycle.

1.7 Justification of the study

The study was to contribute to an improved understanding of menstrual cycle and create a link between the variables which were being studied such as menstrual cycle and its components. It was to help in implementing programs aimed at improving the teachers' understanding of menstrual cycle so as to disseminate the same knowledge to students to be able to relate menstrual cycle stages to conception so as to prevent unintended pregnancies thus improving the decision-making skills hence improved

quality of life. It was to be a break-through in an area that has not received much attention by scholars as compared to studies on menstrual hygiene where most researches have been geared to retaining girls in schools by provision of sanitary facilities such as toilets, water and sanitary pads which has not fully addressed the continued existence of teenage pregnancy given the much attention it has been receiving to date.

This knowledge was to improve approaches that guarantee good teachers' and students' understanding of menstrual cycle such as change of teachers' training curriculum which was to include extensive training on how to teach, what to teach about menstrual cycle and appropriate stage to introduce such concepts. Enhanced findings added to the existing body of knowledge because to the best of the researcher's knowledge, studies on students' and teachers understanding of menstrual cycle in Kenya were few or close to none and in the areas where such studies have been conducted globally, conflicting findings were produced which did not allow us to make overall conclusions especially for Kenya. Thus, further investigations were important to the knowledge and understanding of menstrual cycle given that menstrual cycle is controlled by hormones which start developing rapidly during adolescent through to teenage to youth and during this period a lot goes on in young people emotionally, Physically, socially and Psychologically.

1.8 Significance of the study

The girls who viewed themselves as prepared for menarche and yet their understanding of menstruation and menstrual cycle reflected at best partial information and more so to a greater extent misunderstanding about menstrual cycle were likely to become pregnant while in school and at a younger age. The study Findings were relevant in reducing the gap that existed in the adolescent reproductive health knowledge in Kenya. This study created awareness among students and teachers to understand better their menstrual cycle which was expected that translated into them managing their menstrual health and thus reduced incidences of teenage pregnancy that was caused partly by misconceptions about menstrual cycle.

This study helped to point out the gaps in education curricula in both primary and secondary schools and was anticipated that it helped the education ministry as a whole to make informed decision about curricula change to include more information on menstrual health which would help students understand and thus manage their menstrual health better to prevent future teenage pregnancies. The study helped the teachers who are the major sources of information in students' life to improve or change the way they teach reproductive system and when to start introducing knowledge on menstrual cycle. It also informed policy makers and the community at large to formulate policies and strategies that would contribute to students' better understanding of menstrual cycle, make good use of safe days technique and thus reduction in teenage pregnancy. Finally, the study findings were anticipated to benefit scholars and researchers who had special interest in adolescent reproductive health to conduct further research on students' and teachers' understanding of menstrual cycle in relation to reduction of teenage pregnancy.

1.9 Scope of the study

The main aim of this study was to establish student' and teachers' understanding of menstrual cycle. The study consisted of both the independent and dependent variables. The independent variable was the knowledge about menstrual cycle while dependent variable was the understanding of the knowledge about menstrual cycle. The secondary school students both genders aged between thirteen (13) and nineteen (19) years in two mixed day secondary schools were selected using stratified random sampling school based technique. Secondary school was a learning institution between primary school and college and offered subjects that prepared learners for college or university training. A student was taken to be a person who was learning or someone who was attending secondary school to gain knowledge. Teachers aged twenty four (24) years and not more than fifty five (55) years formed secondary population so as to compare their understanding of menstrual cycle on the basis of experience. Teachers were defined as people who impact knowledge in secondary school students. The study was confined in two mixed secondary schools in Navakholo sub County Kakamega County, Kenya.

Understanding of the knowledge about menstrual cycle was the dependent variable whereby the researcher was to establish the extent to which students and teachers

were able to describe the major concepts of menstrual cycle such as menstruation, follicular, ovulatory and luteal phases and if they were able to relate hormonal and conception processes. Students' and teachers' understanding was taken to mean mental grapple, conception, the capability to capture general associations to specifics, the power to make familiarity comprehensible by applying information about menstrual cycle based on the everyday, scientific and Kenyan science and biology text book and if they could translate that knowledge into real life to help especially the young people to make informed decisions about the sexual health and prevent teenage pregnancy. The study assumed that the two schools were representative enough of all the schools in the country.

1.10 Limitation and Delimitation of the study

This study had some important limitations in that while the two schools were purposefully selected because of their own initiative to exchange the teenage mothers to encourage them to complete school these findings may not have been generalized to other settings in Kenya. Generality of the study results was anticipated to be affected by the location and the type of population whereby in this case the study was conducted in a rural setting and there was no comparison with the urban setting and also it was conducted in only one ethnic area unless a comparative study was extended to other urban and ethnic areas in the country. The stratified random sampling technique for the school-based questionnaire and for the focus group discussions implied that there was no national representation of the quantitative estimates. Teenagers who were not in school and those in primary schools were not included therefore the extent to which young people in general understand menstruation cycle was not explored unless the study was extended to teenage mothers not attending school and primary school children as from class six and their teachers.

Issues of privacy invasion were expected to cause students not to freely interact with the researcher or not to be willing to divulge the relevant information. Use of self-reported instruments (questionnaires) was anticipated that it would introduce some level of biasness that was not to be assessed because it was beyond the scope of this research. Finally given the sensitivity of sexuality issues, norms that surround it, it was expected that it could to be difficult for students and teachers to interact freely

with the selected members of the focus group discussions. The researcher took responsibility to inform the respondents that participation was voluntary and endeavored to maintain confidentiality and privacy. Informed consent was sought from the respondents to ensure voluntary participation. Confidentiality was assured as the questionnaires were self administered without writing respondents names (identity). School principals provided consent for their school to participate. No personal identifying details were recorded on questionnaires or interview notes.

1.11 Assumptions of the study

The study assumed that there existed differences and similarities in understanding of things among human beings, likewise the researcher assumed that students and teachers had different understanding of menstrual cycle depending on their age, gender, level of education, socio-economic status, religion and teachers' experience. It was also assumed that people will have different sources of information for example different sources of information about menstrual cycle such as mothers, peers, health workers which led to misconceptions about menstrual cycle.

The study also assumed that the fact that the school curriculum was uniform there exist differences and similarities in teachers' understanding and thus their teaching of menstrual cycle which in turn affected students' understanding. The study to some extend assumed that people were aware of the phenomenon of menstruation and had different religious, cultural and indigenous explanations about it. Finally in Kenya there were various cultural practices depending on the ethnic groups in that the study assumed that these cultural practices had various cultural factors that influenced peoples' understanding of school science and biology view of menstrual cycle.

CHAPTER TWO
LITERATURE REVIEW

2.0 Introduction

In this section, the researcher discussed what menstrual cycle was for the sake of understanding its importance in the life of a girl child. The researcher also reviewed the various studies previously done on the students' and the teachers' understanding of menstrual cycle by analyzing every objective and focusing on the confounding variables such as age, gender, level of education, Religion, socio economic status and experience for the teachers. The theoretical and conceptual framework was also discussed so as to establish the need to carry out this study.

2.1 Menstrual Cycle

Menstrual cycle was described as the monthly periodic changes in the ovaries and the uterus or endometrium and it was a development that affect girls because it marked the physical, Psychological and emotional change from adolescence to adulthood (Lagana and Jensen 2014).Constructivist theory by Brunner (1966) stated that knowledge was a vigorous progression in which learners created new thoughts or concepts based on their existed or precedential information. He further explained that the learner intentionally selected and transformed in turn constructs hypotheses and made decisions depending on mental structures. Based on this, people had different understanding and explanations about everything they encountered or learned such as menstrual cycle. Therefore, menstrual cycle was discussed in two perspectives, the scientific and the Kenya science and Biology text book perspectives as follows:

2.1.1 Scientific perspective of menstrual cycle

Menstrual cycle takes place repeatedly between menarche when menstruation begins, until the cessation of the menstruation called menopause. Ramathuba (2015) in her study on menstrual knowhow and practices among female teenagers in South Africa defined menstrual cycle as the sequence of accepted changes that take place in the uterus and ovary as an important element of making sexual procreation possible. Ramathuba (2015) explained that the initial signs of teenage years may appear as near as the beginning of eight or nine years and cease at fifteen or sixteen years, with menarche. The common stage of menarche started between 12-13 years in most developing countries, with research revealing that urban, well-informed, median class

young females in most countries were starting their periods at around twelve and a half years or before (Ramathuba 2015).

According to Mwamwenda (2004) in his book entitled Educational Psychology which was an African Perspective, he gave the following statistics about age at menarche that over 70 years ago, girls in Britain used to experience menarche at the age of 15, but the average was about 13 years while in western families with well-nourished children girls menstruated between the age 12 and 13 years and in New Guinea menarche occurred around the age of 18, while in Central Africa girls experienced menarche around 17years of age. He further explained that among well fed Ugandan in Kampala the girls experienced menarche at the age of 13.4years and Transkei, South Africa, menarche was being experienced at the age of 15.5 (Mwamwenda 2004).

Menstrual cycle had been protractedly a subject of ambiguity amongst women where Lagana and Jensen (2014) in their article entitled Ovulation made simple described menstrual cycle as the repeated changes in the ovaries and the uterus (endometrium). Lagan and Jensen (2014) simplified and explained the menstrual cycle as a four-phase process namely Menstruation, Follicular, Ovulatory and Luteal Phase. Williams (2007) in his notes on Visualizing the Menstrual Cycle in which he focused on the impact of a newly developed sequence illustration on Students' mastery. He explained that most models begin with the shedding of the uterine lining and unfertilized ovum. Williams (2007) named it follicular phase which was characterized by a spike in follicle stimulating hormone (FSH). During the first week of menstruation, follicles, hollow shells containing cells and an immature ovum began to grow (Williams 2007). The growing follicles secreted estrogen hormones into the blood (Williams 2007). Williams (2007) went on to describe menstrual cycle as follows: after the first seven days of growth, each follicle began to degenerate except for one. The remaining follicle provides nutrients for the ovum contained within and at around day twelve, the follicle secretes a large amount of estrogen. The estrogen travels through the bloodstream to the hypothalamus, triggers the release of Luteinizing Hormone (LH). One to two days following the secretion of LH, the growing follicle releases the ovum in a process known as ovulation. The follicle from which the ovum was released made up a corpus luteum that released large levels of progesterone into the blood and

caused the uterus to prepare for the possible fertilization of the released ovum. Supposing the egg was not fertilized following ovulation the corpus luteum together with the uterine lining would be shed during menstruation. If the ovum was fertilized then implanted blastocyst developed three layers; the ectoderm, mesoderm, and endoderm in which gastrulation ensued (Williams 2007).

According to Marino et al. (2013) menstruation was described as sporadic release of the blood enriched coating of the uterus all the way through the vagina whereas Menarche is the first menstruation commonly known as the first period which occurs between 13 and 16 years and was a signal that a woman's body was able to bear children. Marino et al. (2013) ascertained that menstruation was the first stage of menstrual cycle which marked the end of one menstrual cycle and the beginning of another that lasted 4 to 7 days. They defined menstruation as the monthly detaching of the uterine fortification which takes place when estrogen and progesterone hormone amounts decrease and no implantation occurred (Lagana and Jensen 2014). South African Concise Oxford Dictionary (2007) defined pregnancy as the state in which a fetus forms in a female's uterus of childbearing age during the stage from beginning of implantation of a fetus to maturity ready to be born.

Follicular Phase is the second phase of the menstrual cycle where Lagana and Jensen (2014) clarified that it covers the first fourteen days of the menstrual cycle starting from the first day all through to tenth to seventeenth day during which the female reproductive system is managed by different reproductive hormones. They explained that the pituitary gland in the brain sends a hormonal indicator to the Follicle Stimulating Hormone (FSH) to the ovaries to engage a number of follicles to grow each month and every follicle engaged during a cycle consist of one egg. The greatest, healthiest follicle and the ova also called the dominate follicle releases an egg for the period of ovulation and the others that are not utilized are reabsorbed (Lagana and Jensen 2014). They continued to explain that as follicles within the ovary grow to maturity increases the level of estrogen, arouse thickening of the lining of the uterus which is necessary for a fertilized egg to embed itself into the uterine lining (Lagana and Jensen 2014).

Ovulatory Phase was the third phase in which (Lagana and Jensen2014) clarified that every step that took place at Follicular phase equipped the body for a sequence of hormonal actions that result into ovulation. Ovulation takes place mid way cycle in rejoinder to a sequence of hormonal changes that are put in place by a hit the highest point in estrogen, happening on the day 13 and 14 from 10^{th} to 17^{th} day of the Follicular phase. This climax in estrogen triggers a short flow in Luteinizing Hormone (LH) which triggers ovulation within twenty four hours up to forty eight hours. Ovulation was the point in time when an egg was freed from the grown-up follicle within an ovary into the fallopian tube where it could be fertilized. They clarified clearly that was the only period within the menstrual cycle that females get pregnant. Once an egg was freed it was feasible for up to one day while the sperm could be feasible for up to three days. This implied that the few days before and after ovulation were mainly fertile days of the menstrual cycle. Conception was most expected to happen when sperms were in existence few days before to or just after ovulation (Lagana and Jensen 2014).

Luteal Phase was the fourth and the last stage of the menstrual Cycle that take approximately fourteen days. During luteal phase the overriding hormone of the Follicular Phase estrogen reduced and progesterone levels increased. Estrogen's role was to fertilize and support development of the uterine lining while progesterone was to preserve that lining so that a fertilized egg could be embed itself to the uterine wall. Progesterone levels were usually at their climax roughly one week after the LH flow, which corresponded to the time implantation of the embryo if fertilization took place (Lagana and Jensen 2014).

In conclusion Lagana and Jensen 2014) said that if fertilization did not take place then progesterone levels reduced and corpus luteum could be taken up again a few days to start of menstruation. This usually marked the end and the beginning of another menstrual cycle in which the brain triggered the start of all the events of menstrual cycle as described above. Menstrual cycles were usually between 24 to 35 days (Lagana and Jensen 2014).

2.1.2 Kenya science and Biology text book perspective

In Kenya, Primary school curriculum covered science subject in which teachers taught science of the female reproductive system in which menstrual cycle was only mention in passing as from class six. At that point teachers did not teach the details of menstrual cycle (Nyamosi et al 2015) despite the fact that some students experienced menarche while in primary school or before form three. Nyamosi et al (2015) KCPE Mirror Science only named and described the functions of the parts of the female reproductive system as follows:

The vagina receives sperms from the penis during sexual intercourse and is the passage of the baby during child birth hence the name birth canal. The Cervix is a muscular neck between the vagina and the uterus and it provides passage of sperms and baby. It also holds the embryo in the uterus. The uterus provides the room for the embryo to develop until birth and the muscular wall of the uterus contract to force the baby out through the cervix during birth. The Fallopian tubes are two tubes connecting each ovary to each side of the uterus which allow for the passage of sperms from the uterus to fertilise the ovum, provides room for fertilisation to take place and passage for the ripe or mature ovum to the uterus during ovulation process. The Ovaries are two oval shaped organs on each side of the uterus, produce ova through ovulation and they work in turns to release an ovum every 28 days (Nyamosi et al 2015).

Menstrual cycle was only mentioned when Nyamosi (2015) was listing Physical changes in girls during adolescence as follows: Menstruation period (monthly period starts), Breasts appear and grow bigger, the girls increase in weight and height, hair grows around the pubic area and armpits, the ovaries produce mature ova, pimples may appear on the face, sweat glands become more active and enlargement of hips.KBL (2014) Primary Science class six also starts by giving us parts of the female reproductive system and later their functions as follows;

The vagina is a muscular tube opening that connects to the cervix, is also referred to as the birth canal and allows the passage of a baby during child birth hence the name birth canal. The uterus or the womb is where the egg develops into a body. The cervix

is the passage between the uterus and the vagina. Two ovaries contain eggs or ova. One egg is called an ovum. Either of the ovaries releases an egg every 28 days (about one month). The two ovaries alternate in releasing eggs. Oviduct also called fallopian tube connects the ovary to the uterus. There are two fallopian tubes in the female reproductive system, one either side. The movement of the ova from the ovary is made possible through the oviduct to the uterus (KBL 2014).

In KBL (2014) book again menstruation was mentioned when listing physical changes in adolescent girls as follows;
There is increase in weight and height, the hips broaden and there is also hair growth under the armpits and on the pubic area. The menstrual flow begins which is monthly shedding of blood from the uterus through the vagina. Pimples may appear on the face. Breasts appear and continue to enlarge (KBL 2014).

The secondary school curriculum covers menstrual cycle in Biology from form three according to Kenya Literature Bureau (KBL2016). KBL (2016) Biology form three book discusses female secondary sexual characteristics which start to show as early as the age of ten in some girls which include development of the mammary glands, enlargement of the pelvic girdle and widening of the hip. Also, hair grows in the pubic and armpit regions and the entire body becomes feminine. Internally the ovaries mature and start releasing eggs and the girl begins to menstruate (KBL 2016).
The (KBL 2016) book defined menstrual cycle in such a way that it associated gamete production as a cyclical activity with a periodicity of approximately 28 days divided into four phases: menstruation, follicular, ovulation and luteal phases. The events of the menstrual cycle involved the ovaries (the ovarian cycle) and the uterus (the uterine cycle) and these were regulated by hormones secreted by the ovary which in turn is regulated by the pituitary gonadotrophins (KBL 2016).

The KBL (2016) book stated that menstrual cycle begun with the discharge of the blood and tissue debris from the uterus. This flow is called menses. Just after menstruation, the anterior lobe of pituitary gland starts secreting the follicle stimulating hormone (FSH) which has two effects. It triggers Graafian follicles to

grow in the ovary and also triggers the ovary to secrete the oestrogen hormone (KBL 2016).

The book KBL 2016 further explained that oestrogen brings about repair and healing of the endometrium (inner lining of uterine wall) which is shed during menstruation and it accumulates to a level which triggers the brain to assemble luteinising hormone (LH). This hormone stimulates the maturity of Graafian follicle which releases an ovum into the funnel of the fallopian tube in a process called ovulation (KBL 2016). After releasing the ovum, the Graafian follicle changes into a yellow organization known as the corpus luteum and the luteinising hormone triggers the corpus luteum to secrete a hormone called progesterone that stimulates thickening and increased blood supply to the endometrium and prepares the uterus for implantation of the blastocyct (KBL 2016).

If fertilization takes place, the level of the progesterone increases and thus inhibits FSH from stimulating the maturation of another Graafian follicle while on the other hand, if fertilization fails to take place the corpus luteum disintegrates and no more progesterone is produced (KBL 2016). The endometrium sloughs off and menstruation occurs which completes the cycle whereby a whole cycle lasts about 28 days in human beings (KBL 2016).

2.1.3 Comparison between Scientific and Kenya science and Biology text book perspectives of menstrual cycle

The Kenya science and biology perspective defined the menstrual cycle in such a way that it associates gamete production as a cyclical activity with a periodicity of approximately 28 days divided into four phases: menstruation, follicular, ovulation and luteal phases (KBL 2016). The perspective further explains that the events of the menstrual cycle involve the ovaries (the ovarian cycle) and the uterus (the uterine cycle) which is regulated by hormones secreted by the ovary and in turn is regulated by the pituitary gonadotrophins (KBL 2016).

Whereas scientific perspective states that menstrual cycle happen repetitively between the ages menstruation when periods start to when the periods cease to take place referred to as menopause. Ramathuba (2015) defined menstrual cycle as the series of

accepted changes that take place in the uterus and ovary as an important element of sexual capabilities. other researchers such as Lagana and Jensen 2014 defined menstrual cycle as a sporadic expulsion of the blood enriched lining of the uterus through the vagina and menarche being the first menstruation commonly known as the first period which occurs between 13 and 16 years a signal that a woman's body is able to bear children. From the above definitions, the scientific seems to be more systematic and specific as compared to Kenya science and biology perspective where it picks pieces of information and put together involving all organs without proper organization for the sake of understanding and also it does not explain menarche as a sign of maturity that a woman's body is able to bear children like in the scientific perspective. As described above by Lagana and Jensen (2014) the scientific perspective relates so well the hormone activities, menstrual stages and conception or getting pregnant compared to the school science and biology perspective.

The two perspectives explain ovulation Phase and relate the activities in the phase to reproductive hormonal functions in which the scientific perspective again gives chronological step during ovulation and makes it clearer how conception occurs compared to Kenyan science and biology perspective which haphazardly gives hormones responsible but does not relate clearly to conception. The scientific perspective by (Lagana and Jensen 2014) states that ovulation takes place mid way the menstrual cycle in rejoinder to a chain of hormonal changes taking place by a climax in estrogen happening on day 13 and 14 from the 10^{th} to 17^{th} of the Follicular phase. (Lagana and Jensen 2014) went ahead to explain that the climax is the time estrogen sets off a brief high supply of Luteinizing Hormone (LH) which sets off ovulation in 24 hours up to 48 hours. Ovulation is the time when ovum is freed from the grown-up follicle in the ovary, through fallopian tube to be fertilized. Scientific perspective clearly states that ovulation period is the only time during menstrual cycle that pregnancy can occur (Lagana and Jensen 2014).

According to KBL (2016) ovulation is process in which Oestrogen accumulates to a level which triggers the brain to assemble luteinising hormone (LH). KBL (2016) explained that the hormone stimulates the maturity of Graafian follicle which releases an ovum into the funnel of the fallopian tube that changes into a yellow body called the corpus luteum. The luteinising hormone stimulates the corpus luteum to secrete a

hormone called progesterone which triggers the thickening and increases blood supply to the endometrium which prepares the uterus for implantation of the blastocyct (KBL 2016). This perspective is not clear when conception occurs and this could cause a lot of misconception and misunderstandings about menstrual cycle and conception. In conclusion, the two perspectives both explained the phases of the menstrual cycle although the scientific is more specific and organized to be understood compared to Kenya science and biology text book perspective.

2.2 The students' sources of information about menstruation cycle

Educating young people about menstrual cycle is essential given the fact that there exist some misunderstandings about the whole process. According to Ogbonna et al (2015), some young people consider menstrual cycle as an odd or dreadful event whereas others perceive it as an uncomfortable or terrifying occurrence. Ogbonna et al (2015) in their study entitled an Adolescent reproductive health challenges in southeast parts of Nigeria among the schoolgirls. Their main objective was to examine the young girl's contraceptive adherence and their knowledge regarding menstrual cycle. The results of the survey revealed that 81.4 percent of the study respondents were educated by their mothers about menstrual cycle. According to the respondents, their mothers were key source of menstrual cycle education and also the most appropriate person's to discuss the matters with since the girls were not comfortable conversing about the same with their fathers (Ogbonna et al 2015).

As Koff et al (2008) affirmed that when the basic education focuses on the hygienic and biological aspects of the menstrual cycle, it leads to inappropriate knowledge amongst young girls about their body's experience. UNICEF (2013) in a study on menstrual hygiene in schools in two Francophone West African countries Burkina Faso and Niger agreed with (Koff 1990) that there was inappropriate knowledge and information about menstrual cycle by giving the following statistics: In UNICEF's (2013) study, 90 percent of young girls in Burkina Faso and 61 percent in Niger, lacked proper knowledge as to what to do when they experienced their first menstrual cycle. A further 79 percent of young girls in Burkina Faso and 81 percent in Niger affirmed that they were quite afraid when they experienced their first menstrual periods.

In this case, it was a mere 14 percent of young girls in Burkina Faso and 48 percent of the young girls in Niger who had obtained any considerable information concerning menstruation prior to experiencing their first periods and that the information about the whole process was availed to them after they had already experienced their first periods. According to young girls' information, it was established that half of them had obtained the key information from their mothers while the other half had obtained the same from other parties such as friends, sisters, female teachers, grand-mothers, aunts, and female neighbors (UNICEF 2013).

2.2.1 Mother and significant others

A study done by Tarhane and Kasulkar(2015) on the awareness of adolescent girls about menstruation in which they evaluated practices during menstruation they reported that though it was desirable to have school teacher or health worker to be the first source of information to ensure that right knowledge had been imparted, it was seen that 88% of respondents recorded mother as a major source of information. They observed that the mothers were the most common source of information which makes the mothers of young people to be integral part of all programs on adolescent health especially menstrual health. As much as mothers are seen to be at the fore front of providing the key information to their daughters, a study done by Raya et al (2013) on menstrual health management in Indonesia whose main aim was to evaluate impacts, practices, knowledge and determinants of menstrual health among adolescent school girls, observed that mothers typically provided information at the time of menarche, but not before, and mostly mothers provided reassurance and advice about how to manage bleeding, what treatments to take to manage symptoms such as pain or odor, food and behavioral restrictions. According to study findings, it was revealed that girls' mothers were the main source of information for 60% of urban girls and 58% of rural girls about the menstrual periods.

A similar study by Echendu et al (2008) among young high school girls in Nigeria about the menstrual cycle practices and awareness revealed that out of the 401 survey respondents attested to have discussed the menstruation matters mothers constituted the highest percentage of around 47.1 %. The study demonstrated that the information about menstrual cycle given by mothers was imperfect, erroneous, based on cultural beliefs and constituted the key concern as to the negative perception of the

menstrual periods. In Echendu's et al (2008) study only 3.3% of the respondents claimed to have discussed menstruation with their aunts because majority of young girls in Nigeria lived together with their extended families due to their traditional cultures hence were able to obtain the key information from their aunts (Echendu et al 2008).

In conclusion mothers are the first source of information but their knowledge on menstrual cycle demonstrates some misconceptions often incomplete and incorrect information which was biased since it constituted of traditional beliefs which is a key factor attributed to negative perception towards menstruation (Echendu et al 2008).

2.2.2 Peers

Peer groups are also a key source of menstrual cycle information since young girls tend to discuss the matter with their friends. However, peer groups provide undependable and inaccurate information about the whole process since majority of these young girls also lack proper information about human sexuality matters (Echendu et al 2008). Echendu et al (2008) observed that peers and friends were second to mothers but many girls had limited understanding about how to manage menstruation safely, including at school.

While UNICEF (2013) was giving its report on Menstrual Hygiene in Schools in two West Africa countries i.e. Niger and Burkina Faso, it noted that friend to friend support was significant for majority of young girls since they disclosed that their friends in most cases assisted them when one experienced their periods while at school. According to the survey, 83 percent of school girls in Burkina Faso and 77 percent in Niger confirmed that other students behaved properly towards other girls who experienced menstruation (UNICEF 2013).

2.2.3 Health workers

Health workers especially nurses naturally are expected to know or to be in a position to support young girls with information regarding menstrual cycle but no. A study done by Echendu et al (2008) reported that among the respondents who discussed their menstruation tribulations only 3.3% was with the health professional. They explained the low consultation on matters pertaining to menstruation was associated

with the fact that most of the surveyed respondents constituting about 39.3 percent considered menstruation not to require health consultation since they perceived it as a regular normal process. Whereas Abdelmoty et al (2015) agrees with Echendu (2008) while submitting their findings observed that only 0.7 percent of adolescents affirmed to have received useful menstruation information from a health care provider may be for the same reason that menstrual cycle is a natural process.

According to Raya et al (2013) as much as girls identified health providers as a preferred source of information delivered through schools or through clinics only 50% of schools were visited by a health staff once a year to provide education about menstrual cycle while a few adolescents reported to have received information about menstruation from health providers. Raya et al (2013) noted that lack of coordination between schools and health workers made it difficult for providers to visit schools including providers' perceptions that schools considered counseling and education to be disruptive to normal school lessons and that the subject matter was too sensitive to be discussed in class (Raya et al 2013).

2.2.4 Teachers and Educators

Teachers and formal education sector has been perceived to provide meager information concerning reproductive health a factor considered wanting in view of the significant position teachers embrace as official instructors in the process of teaching the young people (McMahon et al 2011).According to Echendu et al (2008) in their study on Perceptions and Practices on Menstruation in Nigeria out of the respondents they interviewed who affirmed to having discussed the their menstrual cycle matters teachers were last on their list as their most common source of information.

While Julius (1992) was reporting on research findings of Shirley Prendergast who had spent three years studying how girls managed menstruation parents felt that it was the school's duty to cover the topic but the information that was being provided during personal, social and sex education (PSE) lessons was too little and was provided too late after the girls had started their periods. In the study 9 per cent of girls begun to menstruate at primary school, some were as young as nine yet few junior schools mentioned it (Julius1992)

In another similar study by Raya et al (2013) while reporting their findings to UNICEF Indonesia on menstrual hygiene management ascertained that schools were a common source of knowledge on menstrual cycle. In the study 80 percent of those interviewed confirmed to have taught in school and that menstrual information was given by teachers during science and social education lessons but the girls who were enrolled in non-science and social classes had not as much of access to menstrual cycle information than their counterpart in science and social classes. Teachers were the main source of menstrual knowledge for teenage boys (Raya et al 2013).

2.2.5 Mass Media

Although mass media and advertisements are key source of information in shaping peoples' attitudes, Abdelmoty et al (2015) who conducted a study in Egypt disagreed by stating that only 3.7 percent of young girls asserted to have gained their menstrual cycle information from the mass media. The fact that mass media is considered to perpetrate certain non-cultural beliefs concerning hygienic crisis of the menstrual periods was the major reasons many did not consider it as an effective source of information. (Abdelmoty et al 2015).

Information about sexual issues can readily be provided by the mass media. According to Yende and Mataboge (2015) respondents regarded media as a source of information, particularly for issues such as sexual intercourse and sexual health. They reported that participants confirmed that on the radio there was a presenter who talked about prevention and diseases, also True Love magazine the respondents could read about menstrual cycle articles. The participants in their study confirmed that television programs such as "Intersections", sexual intercourse and condoms use were helpful in discovering what the students did not know (Yende and Mataboge 2015).

As much as Bhartiya (2013) in her study on Menstruation, Religion and Society agrees with Yende and Mataboge(2015) that advertisements are influential in shaping people's attitudes, she asserts that advertisements create the fear of leaking, stuffed, staining, and smelling in students. She explained that they use an advertising technique 'You got the problem, we have the solution'. She continued to say that Femcare companies sold their products using shame and in turn it extended the stigma

around talking about menstruation openly which was considered offensive and disgusting Bhartiya (2013).

Print and digital media, internet and social media are important channels which shape the knowledge and perceptions of general population. Rajak (2015) while supporting the above statement said that participants in his study mentioned using internet to find answers to their curiosity about menstruation. The respondents in the study commented on how social sites portrayed moods and environments around menstruating women in the context of either humor or satire. Use of media, internet, social sites and virtual interactions between new generations show that the internet can be very influential for young people to find out details about menstruation therefore, different mediums of media shape people's knowledge and perspectives. Rajak (2015) disagreed with what media had done and still do today abiding by a social norm of secrecy regarding menstruation for example menstrual blood has remained hidden when menstruation is portrayed by blue fluid instead of its true color, red in advertisements (Rajak 2015).

2.3 The teachers' sources of information about menstrual cycle

The teachers' sources of information are the same as the students', the only difference is that some teachers training colleges offer sexuality education and some countries have gone ahead to make sexuality education compulsory. Some misunderstanding regarding information obtained from teachers to their student's about menstruation matters may exist. According to Chandra-Mouli and Patel (2017) who did a study in developing and medium income states on knowledge Mapping, understanding of menarche and menstrual health among young girls both teachers and mothers, with men being the majority in Kenya confirmed that menstrual information provided nearly no explanation. In Kenya, the researchers reported that teachers did not consider provision of menstrual cycle information as their key responsibility and they were also uneasy to discuss menstrual information with their students (Chandra-Mouli and Patel 2017).

2.3.1 Teachers training colleges

In a study done by Chandra-Mouli and Patel (2017) in which they assessed the menstrual health information and menstrual hygiene amongst young school girls in developing states. The survey results indicated that, in Ghana 70 percent to 90 percent of teachers were trained on various strategies essential in providing their students with information about their menstrual periods. The most common way the teachers were trained was the use of play approaches to provide the key information. The strategy was observed to be more effective in schools using them compared to other schools not utilizing the same. In this study 82.4 percent of respondents stated that they were unprepared experiencing menarche. However, in rural based schools where majority of key information was obtained from girls' mothers, and their peer groups, most of the participants asserted that the menstrual topics were not properly taught in schools and thus 4/5 of the school girls interviewed needed more information.

According to McMahon et al (2011) who conducted a survey on the young girls experiencing their monthly menstrual period whose main aim was to evaluate the reflections among schoolgirls on menstrual management in Kenya. They found out that mothers and educators felt uncomfortable discussing menstruation. They explained that educators did not take responsibility to train young people on menstrual cycle because they thought it was above their professional approval. Some educators in the study confirmed that they hardly obtained any relevant information about menstrual cycle while at school as young students nor did they receive it while at Teacher College training centers hence they felt not properly prepared to provide the same information to their students (McMahon et al 2011).

2.3.2 Science and Biology text books

This was only covered by science and biology teachers who take to teach the mentioned subjects at primary and secondary level respectively as provided for by the science and biology curriculum (KBL 2014 and KBL 2016). A study by (Mwita 2010) among less fortunate women and young people in Nairobi on problems and experiences and with menstrual cycle, it was reported that the girls in school differed in their opinion with what the text book explain in that some teachers supported them by providing information which was informal, based on the general knowledge and worldview of the teacher rather than on the official curriculum. The girls in the study

reported that the information focused on advising them about cleanliness and avoiding boys as a substitute of knowledge about the biological aspects of menstrual cycle (Mwita 2010).

2.4 The students' understanding of menstrual cycle

Students' understanding of menstrual cycle was discussed according to their age, gender, level of education, socio-economic status and religion as follows;

2.4.1 Age

Though young girls considered themselves well prepared for menstrual experiences, their explanations of menstrual cycle demonstrated imperfect information, with various misunderstandings as well as unawareness of menstrual health knowledge Koff and Rierdan (2008). Koff and Rierdan (2008) conducted a study on the Adolescent Girls' Understanding of Menstruation and menstrual cycle in which Sixth grade girls were interviewed. The girls were evaluated on their expectations and preparedness for menarche, their parents' responsibility in their training and their biological understanding of the menstrual cycle matters. Also they were asked about characteristics of the menstrual cycle, menstrual hygiene, and menstrual-related changes. Koff and Rierdan (2008) reported that the girls 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. They further explained that the girls linked a range of negative mental and emotional changes with menstruation which indicated that even though they had not mastered the biology of menstruation, they previously had learned and internalized the cultural stereotypes and myths about menstrual cycle (Koff and Rierdan2008). They concluded that failure to effectively instruct young people about their own body function on menstrual cycle has grave implications such as teenage pregnancy.

Raya et al (2013) agrees with Koff and Rierdan (2008) in their study in Indonesia on menstrual hygiene management in which they focused on impacts, determinants and practices among teenage girls. Raya et al (2013) observed that 97% of girls had heard of menstruation before menarche although many stated that they were not well prepared and that they were confused when they first menstruated and lacked adequate knowledge 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. Raya et al (2013) confirmed that unpreparedness contributed to feelings of fear at menarche among 44% girls in which many girls were surprised, afraid and sometimes distressed when they first noticed bleeding. Among those girls who had not yet menstruated, 65% said they felt prepared for menstruation and 68% asserted that they would know how to manage when menarche occurred (Raya et al 2013).

In another similar survey by Thakur et al (2014) in India their finding showed that 58.3% of young women had received knowledge about menstruation prior to menarche while 69.8 percent of older females agreed that young girls acknowledged knowledge before menarche meaning that 30 to 40% of young people had not gotten any information regarding menstrual cycle prior to menarche. Discussions and interviews in their study confirmed that most young people did not know much about menarche prior to the occurrence of their first menstruation and a few were very terrified when it occurred (Thakur et al 2014). Most of the girls in the survey by Thakur et al (2014) regarded menstruation as natural process which to them depicted a sign of attaining womanhood and something to be proud of while others viewed it as unjust that it was only girls who suffered while boys did not. According to Thakur et al (2014) he confirmed his anticipation to find young girls being more knowledgeable on menstrual matters than their adult counterparts.

According to Raina & Balodi (2014) the girls reported that menstruation was a difficult subject within families, they 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. Raina & Balodi (2014) explained that similar studies which had been conducted among young people in Uganda, Zimbabwe, Kenya, Ghana, and Tanzania had all observed uncertainty about menstrual cycle, menstrual processes, and lack of practical menstrual linked to management provided to girls pre

and to some extend post menarche particularly the ones conducted by Sommer (2009) and Fehr (2011)

2.4.2 Gender

Many young people have issues in differentiating conception period to the condition of uterine lining and the menstrual phases. A study done by Yip (2010) on Children's misconceptions of both genders on reproduction and implications for teaching, their main aim was to evaluate misunderstandings children develop after being taught about menstrual cycle. Yip (2010) discovered that the children still had difficulties in conceptualizing scientific knowledge. He viewed the major source of the misconception and recommended that conceptual development could be certified by giving instructions at school which does not have extreme truthful detail so as to establish expressive associates between new and prevailing perceptions and thus consider students' earlier knowledge (Yip 2010).

According UNESCO (2014) insufficient information, misunderstandings and negative menstruation attitudes may cause girls experiencing it for the first time to have a negative self-esteem which might cause them to develop low self-esteem during their various development stages. The report further explained that the silence of various cultures regarding menstruation raises the opinion that menstruation is dreadful thing which need to be concealed resulting in to misunderstandings and negative perception towards it. Therefore, according to the report irrespective of the fact that the same curriculum is designed for both boys and girls, the objective of the adolescence education should be to create awareness about menstrual cycle and it processes. UNESCO (2014) concluded that creating awareness among boys and male teachers on menstrual cycle would be geared to creating conducive learning environment for teenage girl, as young men's misunderstanding about menstrual cycle was supporting the shaming and mocking behavior among boys that was extensively widespread in schools.

In another similar study done in Taiwan by Chang et al (2012) in which they explored boys' experiences and attitudes relating to menstruation, one major discovery was that no one talked about menstruation with the boys. The boys were not allowed to talk about menstruation with anyone. Chang et al (2012) reported that the boys were also

not encouraged to talk about menstruation with each other while at school. They seemingly understood that their parents did not want them to spend their study time on such topics which were not important for their future. The study also found out that the information boys received from school, peers, parents, and the internet was inaccurate or incomplete.

Chang et al (2012) concluded that boys' attitudes to menstruation and menstrual hygiene ranged from disinterested to extremely negative by the following statements from the boys that sometimes when the girls used toilets, the blood would drops on the rim of the stool and when the boys swept they would feel very disgusted when the boys used water to flush it (Chang et al., 2012).

According to Sommer et al (2016) the existence of unsupportive social environments that in most cases exist at school, male students reported to have had no or insignificant information concerning menstrual cycle. The boys teased and bullied young girls since they were not in a position to understand the various girls' behaviors during their periods.

2.4.3 Level of education

Teachers and mothers are always uncomfortable discussing menstruation with young people. According to teachers, menstruation as a topic in most cases is considered to be like sex, which traditionally was secretly discussed among adults (McMahon et al 2011). They recorded that one of the teachers whom they interviewed said that supposing parents or neighbors heard teachers teaching how to manage menstruation the parents may not be amused. McMahon et al (2011) explained that most teachers felt that it was not their responsibility and was beyond their professional approval to students about menstruation. The teachers had not been taught about menstrual cycle in teacher Colleges and felt that they were poorly equipped to train young people on menstrual cycle (McMahon et al 2011).

In another study done by (Mwita 2010) in Nairobi Kenya on problems with menstrual cycle and experiences among low socio economic women and schoolgirls, (Mwita 2010) found out that girls in school felt teachers were supportive by informing them but more often informal, based on the teachers general knowledge as well as their

personal opinion rather than what the official curriculum dictates. Also, the information provided in most cases was aimed to caution girls as to maintaining hygiene and keeping away from boys rather than providing the essential biological information concerning the aspects of menstruation (Mwita 2010).

2.4.4 Socio-economic status

According to Raya et al (2013) who did a study on menstruation practices in Indonesia where they assessed their understanding, practices, determinants and impacts of menstrual management. They reported that the median knowledge score of questionnaire respondents was 9 out of 15 true or false questions for both urban and rural girls which were also similar between provinces. Raya et al (2013) explained that the majority from both urban and rural correctly answered that menstruation signified prime of life among girls and was a normal process although less than half knew that the menstrual cycle was controlled by hormones and that menstrual blood came from the uterus. Almost a quarter of girls did not know that menstruation signified that a girl was now biologically able to get pregnant. Raya et al (2013) continued to explained that most girls and boys participating in Focus Group Discussions had a basic understanding that menstruation occurred if an ovum was not fertilized by sperm and signified prime of life (Raya et al 2013).

Raya et al (2013) asserted that in-depth understanding was limited and misconceptions were common more so 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. In the study others reported being surprised when they experienced their second menstrual period, being unaware that menstruation happened more than once or as frequently as monthly. Raya et al (2013) reported that misconceptions that menstruation was unclean or dirty were common in which 20% of urban girls and a quarter of rural girls thought menstruation was a disease, three-quarters of the girls felt it was dirty or unclean and that menstrual blood contained dangerous substances. Girls who participated in FGDs also described menstruation to have occurred to remove dirty blood from the body (Raya et al 2013).

According to Sommer et al (2016) at least 250 million girls aged between 10 years to 14 years living in low income states and almost 56 million of the same age were living in middle-income states in 2014.According to these girls, they had received insufficient information before experiencing their first menstrual periods which caused them fear, embarrassment and felt shameful while managing their periods mainly in schools.

2.4.5 Religion

Teenage girls are usually misdirected about cultural beliefs regarding menstrual cycle and how the society expects them to maintain those beliefs. Ramathuba (2015) concurs with the above sentiments that menstruation is strongly connected to religious and cultural beliefs and once menstruation starts the girl is socialized how to treat boys and that sexual intimacy was not permitted. The cultural belief that menstruation is dirty and must not be discussed in mixed company need to be curtailed since it denies young girls a chance to be well informed and to have them manage their periods (Ramathuba2015)

Various religions have different practices when it comes to the concept of menstruation. Ramathuba's (2015) results were same as Santina et al. (2013) where fifteen percent of young females in Gujjar Indian during menstruation were not allowed to participate in community rituals. Ramathuba (2015) further explained that 43.7 percent of adolescent girls in Indian did not take part in ceremonies and 36.2 percent of social activities with family during menstruation (Ramathuba2015).

Stigma builds up because these religious practices encourage impurity of women and their menstrual cycle processes. Reluctance to talk about menstruation normally and the religious people referring to menstruating women as unclean curtail any effort that is being made to educate young people about menstrual cycle. Bhartiya (2013) confirmed the above sentiments through her study religion and menstruation that Menstruation in the world was really stigmatized. Bhartiya (2013) continued to explain that all religions excluding Sikhism referred to menstruating woman as ritually unclean. She further explained that society was not ready to discuss menstrual cycle which led to young people being misled. They were poorly informed and tended to cling on various misunderstandings (Bhartiya 2013).

In a majority of middle income states, women are considered to be impure during their menstrual periods and are thus limited in their mobility and behavior. In major parts of the world, menstruation was linked to various cultural taboos, uncleanliness and shame (Thukar et al 2014). Thukar et al (2014) concluded that menstruation was a daughter and mother secret in many families and hence could not be openly discussed.

2.5 The teachers' understanding of menstruation cycle

The teachers' understanding of menstrual cycle was discussed under the following confounding variables whose understanding depended upon.

2.5.1 Age

Female teachers counsel female students without formal authorization depending on the personal needs of the girls especially when a student has spoilt her clothes with menstrual blood or feels sick and requests permission to go home. McMahon et al (2011) in their study on the girl and her menses in rural Kenya found that only one older female teacher was individually counseling young girls regarding menstrual health in one of the schools which had been dominated by female teachers of different ages implying that the older a teacher becomes the more competent they become to counsel menstruating girls (McMahon et al 2011).

In a similar study by Julius(1992) while reporting on Shirley Prendergasta findings, a researcher who had spent three years studying how girls coped with menstruation said that based on interviews with 500 girls in single-sex and mixed schools around the country numerous teachers said that while sex may be openly discussed at school, menstruation was often covered in one brief lesson that emphasized the biological aspect, rather than emotional or practical consequences (Julius1992).

In Portugal human sexuality and reproduction is taken by all the teachers in their training which is usually regarded essential but Veiga (2007) in his study in which he evaluated behaviors, beliefs and knowledge of Portuguese primary school educators on menstruation. The data were collected from148 respondents about their beliefs, knowledge and behaviors about menstrual cycle of 6–10 years old. Veiga (2007) found out that despite being required by legislation to teach menstrual health, it was not easy because 85% of the respondents were not convinced adequately to train

young people on menstrual cycle and committed scientific mistakes about areas of the human female body.

2.5.2 Gender

Julius (1992) observed that most teachers appeared not to have thought about the significance of their own attitudes and behavior, or the effect of school facilities and policies on girls' ability to cope. He explained that 80 per cent of the respondents agreed that male teachers in particular were found to ignore the problems and some women took on the attitude that they coped, so the students need to cope also (Julius1992).

Women do not generally share information about menstruation with men and boys. Most men do not know about the normal physiology of menstruation, such as the menstrual cycle. Mahon et al (2015) in their study entitled putting the men into menstrual cycle in which they evaluated the responsibility of males in menstrual cycle management. They observed that only 22% of men knew the phase of menstrual cycle in which a woman is fertile enough to conceive. UNESCO (2014) Technical Note while agreeing with Mahon et al (2015) emphasized that male teachers were not adequately trained to attend to girls' needs. The male teachers did not allow girls to wash rooms during class time and misunderstood the girls' failure to participate in class during their menses.

The UNESCO (2014) technical note recommended that male teachers should be knowledgeable enough regarding menstrual cycle and menstrual health management so as to maintain female students in school during menstruation. It also recommended that teachers in general should provide a less stigmatized environment at school for menstruating girls as they had fewer female instructors in intermediate education institutions in low to middle class socio economic countries (UNESCO, 2014).

2.5.3 Level of education

Teachers and mothers are always uncomfortable discussing menstruation with young people. Teachers perceive knowledge on menstrual cycle to be strongly connected to sexuality which is usually discussed among adults (McMahon et al 2011).According to McMahon et al (2011) who conducted study in rural Kenya, they reported that

teachers felt it was not their responsibility and was further than their teaching approval to teach students about menstruation. They were not trained on menstrual cycle and therefore were not well prepared to teach it (McMahon et al 2011).

In a similar study done by Chandra-Mouli and Patel (2017) on understanding the knowledge of menstrual cycle in low and middle-income countries (LMIC) they recorded that 70–90% of school teachers who had been instructed on how use various strategies especially play models to pass menstruation information to their students found it rather easy and confident to discuss these matters with their students. However, their counterpart teachers who were not trained on the same issues found it difficult to discuss the same hence they provided limited information concerning menstrual cycle to their students (Chandra-Mouli and Patel 2017).

In another related study by (Mwita 2010) on problems and experiences with menstruation in Nairobi Kenya among low-socio-economic women and schoolgirls affirmed that the students received necessary support from their teachers on matters pertaining to menstruation which the teachers based on their past experience and their personal opinions rather than what the official curriculum dictated. They further stated that, the information they received mostly entailed them remaining clean while experiencing their periods as well as keeping away from boys rather than emphasizing the biological knowledge on menstruation (Mwita 2010).

2.5.4 Socio- economic status

According to McMahon et al (2011) who conducted a study in rural Kenya Students demonstrated different understanding levels on what their teachers provided regarding matters of menstruation. The girls described some teachers to have been very supportive in these issues whereas others reported that they were punished when they requested to leave school early due to their menstrual periods. In this case, the girls disclosed that they would leave school in total secrecy to avoid being punished. They explained that it was very tricky for teachers to talk about menstruation with girls because then the teachers had to also discuss sex (McMahon et al 2011).

Usually, teachers are barred from discussing sex matters with their students by cultural taboos. Teachers in Tanzania cited cultural taboos as their major reasons they did not support their students on matters of sex and menstrual cycle. According to Chandra-Mouli and Patel (2017) who did a study on understanding knowledge of menstrual cycle, their main aim was to evaluate menstruate cleanliness as well as menstrual health amongst girls who have reached teenage in developing countries. Students in rural schools in Tanzania were cautioned by their teachers about their parents being angry in case it was disclosed to them that their daughters had acquired menstrual knowledge from the teachers. However in a similar study undertaken in Kenya indicated that teachers did not recognize menstrual education to be among their major responsibility and also they did not feel well prepared to discuss the same with their students (Chandra-Mouli and Patel 2017).

In another study by Sommer et al (2016) on A period in which action had to be taken globally, whose main objective was to assess Girls' Menstrual health expectations in Schools argued that Many school systems in less developed countries had teaching fraternity and administration dominated by male teachers. The teachers and educators were not aware or rather were not willing to discuss the various problems faced by female students and female teachers when experiencing their monthly periods (Sommer et al 2016).

2.5.5 Religion

Religious practices and taboos surrounding menstruation usually limit the amount of support and information provided to the young girls. UNICEF (2013) reported that in their strategy on Menstrual Health in Schools 86% of all school principals and educators interviewed agreed that menstruation was no mentionable affair, a prohibited, concealed, disgraceful discussion. UNICEF (2013) observed that most of the interviewed talked only to fellow women about menstrual cycle and its processes. Women rarely talked about menstruation even with fellow women. UNICEF (2013) concluded that responses of some of the teachers demonstrate deep rooted misconceptions on religious and cultural beliefs about menstruation and menstrual cycle.

Religious leaders always perceived teaching menstrual cycle as provoking children to misbehave with boys and teachers were embarrassed to talk about menstrual health with their own children. McMahon et al (2011) concurs with (UNICEF 2013) that in the past generations a menstruating girl was not allowed to participate in a array of family chores, such as cleaning family sacred utensils and not entering the parents' bedroom (McMahon et al 2011).

2.5.6 Experience

Many teachers do not know what menstrual health good practices are and therefore cannot advice girls or answer girls' questions about what activities are safe or unsafe during menstruation and also menstrual cycle covered by existing curriculum and teaching materials is not adequate (KBL 2014 and KBL 2015). A study done by Raya et al (2013) in Indonesia in which they assessed the practices, impacts, determinants and understanding of menstrual health among adolescent school girls. Teachers confirmed their understanding of biology of the menstrual cycle but lacked adequate understanding of menstrual health management and were not able to address all the questions of adolescent girls. The respondents did not have the menstrual knowledge to assertively counsel on menstrual cycle. Raya et al (2013) reported that some teachers assumed that girls already had the knowledge on menstrual cycle and so did not need to be taught or that menstrual health was not included in the standard curriculum or teaching materials and therefore was not prioritized(Raya et al 2013).

All the teachers in Portugal must cover the topic on human reproduction and sexuality as they undertake their basic teaching training as indicated by Veiga (2007) in his study on Sexuality and human reproduction in which he evaluated beliefs, scientific knowledge about menstrual cycle and behaviors towards menstruation of Portuguese teachers. Veiga (2007) found out that despite being required by legislation to teach menstrual health, it was hard to attain, due to weaknesses in the training of teachers. 85.1% of the respondents were ill prepared to teach menstruation to young people and committed scientific mistakes about menstrual health. Veiga (2007) concluded that it was necessary for training schools to give more consideration to the training of school teachers in sexuality and human reproduction.

2.6 Correlation between the students' and the teachers' understanding of menstruation cycle

Relationship between students' and teachers' understanding of menstrual cycle was discussed according to their age, gender, level of education, socio-economic status and Religion that contributes to their understanding.

2.6.1 Age

A study done by Thakur et al (2014) in which they evaluated Knowledge, restrictions and practices associated to menstruation in Mumbai, India amongst young ladies from low socio- economic society. They observed that 64% of the young ladies and 81.5%t of older females affirmed that the information teenagers received about fertility and menstruation was very minimal. A total of 76.8 percent and 92.3 percent of adult women and young ladies explained that the information provided to these young girls was inadequate. The inadequate information meant the girls had received insufficient information which was not practically beneficial or either the girls were misinformed which depended on where they obtained the information (Thakur et al 2014).

According to Markon (2013) parents, teachers, and schools were uncomfortable and unable to adequately address the needs of their children. He further explained that Sexual health education traditionally was considered a private matter that took place between a girl and her aunt on her wedding night. Markon (2013) confirmed in his study that it was prohibited for individuals to teach menstrual cycle with explicit sexual messages and therefore teachers were compelled to over-simplify language and encourage children to simply stop thinking about sex and stay away from the opposite gender. Markon (2013) also observed that adolescents had great interest in their own sexuality and felt embarrassed to talk to adults and instead turned to their peers for knowledge. He further argued that the science curriculum basic biological aspect of maturation was taught without a focus on reproduction or issues of sexuality such as menstrual cycle (Markon 2013).

A report by (Mwita 2010) agreed with Markon (2013) that there was scanty information about menstruation among all women of varied ages. (Mwiti 2010) conducted study in Korogocho, Nairobi Kenya whose main objective was to evaluate problems and challenges encountered by young school girls and low socio-economic

women during their menstrual periods. It was noted that majority of the surveyed participants were not able to describe the biological terms associated with menstruation. Moreover majority of the surveyed participants were of the view that, menstrual period signaled the time a women was likely to get pregnant which was a misunderstanding linked to the belief that when young girls started experiencing their monthly periods, then they could not play with boys anymore (Mwiti 2010).

2.6.2 Gender

Menstrual health teaching that is usually undertaken by schools is only on the biological aspects of menstruation and to some extent limited in information about menstrual cycle. It is usually intertwined with religious and behavioral restrictions delivered in religious classes. Raya et al (2013) agreed with the above sentiment in their study they conducted in Indonesia that majority of girls had received some information about menstruation through schools although the respondents felt that they were not comfortable learning about menstruation with adolescent boys' present and with male teachers because the topic was sensitive, filled with many taboos while male teachers also felt ill-equipped to teach menstrual cycle (Raya et al 2013).

Most sex education classes briefly covered menstrual cycle without going into the details by describing an unfertilized ovum as the cause of menstruation. Eördögh (2014) in his study on men's knowledge about menstrual cycle stated that most men in their stories described how school had not helped them to understand menstruation. The boys in the study said that from their experience, sex education was less than useful. Eördögh (2014) gave the following quotes from the respondents that: In 7th grade one male respondent remembered how he was taught menstruation that the girls had three holes without much explanation attached to it. Eördögh (2014) continued to explain that according to his respondents high school did not make things better because they learned about periods happening and when they did not. (Eördögh 2014).

According to Eördögh (2014) the stories from several young boys who participated in the survey described their persistent apprehension and hatred to menstruation matters and how they seemingly thought that their girlfriends were wild, overly expressive and difficult when experiencing their monthly periods. (Eördögh2014) concluded that

boys' knowledge about menstruation was disorganized and unexplained about what happened to girls, contributed to a gap in boys' understandings about menstrual cycle. According to study conducted by Rajak (2015) revealed that most men and women do not in most cases freely discuss about menstruation due to taboos, fear and traditional myths linked to menstruation. Rajak (2015) in her study on she got her period in which she evaluated Knowledge and Perspectives of men on Menstruation. She argued that it was vital to take on open discussions about menstruation because it empowered women and helped men to have a better understanding of menstrual cycle and its process. She continued to explain that science has enhanced the general understanding of human biology but most men were still unable to gain proper knowledge concerning menstruation and its impact on women. The results showed that most respondents lacked appropriate knowledge concerning menstruation as a biological process since they were of the opinion that menstruation was a women's problem hence was not significant for men to understand it (Rajak 2015).

2.6.3 Level of education

A study conducted by Koff et al (2008) among college women where they evaluated their knowledge of menstrual cycle that is menstruation, ovulation and menopause. Koff et al (2008) found out that the respondents' knowledge was faulty and fell short of logical and acceptable literature about menstrual cycle. The results demonstrated lack of menstrual cycle knowledge among women of all levels of education. They concluded that it was necessary to approach menstrual education by all ways such as the biology of the menstrual cycle, pragmatic knowledge and variability of associated physical and behavioral changes (Koffet al 2008).

Opportunities accorded to female teenagers to develop health literacy are ignored and are sometimes purposely diluted by fellow women who become pregnant. Yende and Mataboge (2015) observed in their study that some teenage student mothers were not attending pregnancy prevention and Life Orientation classes. In spite of the teenage student mothers knowing how pregnancy occurs they still got pregnant again due to her ignoring the previous experience and engaging in bad company and drinking (Yende and Mataboge 2015).

In conclusion Thakur et al (2014) asserted that adolescence and menstruation are in most cultures perceived as a taboo hence it is not often discussed between mothers and their daughters. Therefore, this perception is the major reason mothers are in most cases unwilling to involve their daughters in discussing menstruation matters. This therefore was attributed to lack of appropriate knowledge on their mothers' part which led their daughters to inappropriate information about menstrual cycle.

2.6.4 Socio-economic status

Social economic conditions are key factors that influence knowledge and practices related to menstruation. Absence of education and learning resources on menstrual health management in low economical status regions in Africa lead to poor menstrual knowledge. According UNICEF (2013) in a study on menstrual health knowledge in Schools in Burkina Faso and Niger it was revealed that teachers had no education material. Teachers in the study emphasized that there was need for teachers to be trained well in menstrual health management. They recommended that puberty and menstrual health should be integrated in the formal curriculum and to be made examinable to test students' understanding on the subject matter. Teachers who were female recommended that male students and male instructors need to be involved in the menstrual health management education (UNICEF 2013).

Majority of young girls in developing countries attain their pubertal age while lacking proper knowledge and also misunderstanding about menstruation causes them to be unprepared on how to cope with it and also not to be sure of where and when to look for help Chandra-Mouli and Patel (2017). The knowledge gap and misconception among young people could be attributed to the adults around them especially their teachers and parents since they also lacked proper information and were in some cases uncomfortable to discuss matters pertaining to sexuality, menstruation and human reproduction which in most cases were laden with shameful and dirty associations (Chandra-Mouli and Patel 2017).

Chandra-Mouli and Patel (2017) review's aim was to evaluate how adolescent girls in developing states were knowledgeable concerning their preparedness of getting to menarche, menstruation, where they obtained information about menstruation as well as how their neighboring adults helped in providing the girls with the essential

information required. The results from the review demonstrated that young girls who had reached adolescent in developing countries lacked information and were also unprepared for menarche. Chandra-Mouli and Patel (2017) went on to explain that the basic information the girls obtained from their mothers, close family members especially their aunts and female teachers was inadequate due to the fact that those providing the information were also not well equipped. Furthermore majority of their aunts and teachers were not readily available to respond to the girls' needs (Chandra-Mouli and Patel 2017).

In conclusion Chandra-Mouli and Patel (2017) said that considerations needed to be made in order to devise ways of equipping the girls with the right and appropriate knowledge capable of allowing them to properly understand and effectively respond to their needs during menstruation (Chandra-Mouli and Patel 2017).

2.6.5 Religion

In Islamic Qur'an (2:222) almost every act of worship is forbidden for menstruating women. The underlying understanding is that restrictive prohibitions in worship consider women in menstruation to be highly spiritually impure and unclean to touch the Qur'an, a believer's guide. The Qur'an teaches that if anyone is in a state of ceremonial impurity, then he or she needs to purify him or herself before prayers (Qur'an 2:222). Allah makes such prohibitions in the Qur'an so as to cleanse them and also to prepare them for his favor so that in the end they may be grateful. (Qur'an 5:6). The verse implies that if a woman is menstruating, will keep away from worship acts during it and until purified of it after that they can be approached as Allah has ordained (Qur'an 2:222).

According to Bhartiya (2013) in her study on Menstruation, Religion and Society the menstrual practices kept women from positions of authority in Christianity. The results were consistent with Qur'an teaching, Judaism and Catholic that women were not allowed having sexual intercourse during menstruation. In the same study menstruating women were secluded in special huts in Russian among Orthodox Christians. Bhartiya (2013) reported that menstruating women were not allowed to attend church services, meet men or prepare fresh foods.

She continued to explain that in Judaism, among orthodox believers and even chief Gandhi considered a menstruating woman as impure and was not allowed to pray or enter religious places until a ritualistic bath was carried out. Many religions worldwide treated menstruation as a demonstration of the formless women's souls because of their sexuality. Women would cleanse their soul to become clean then they were to stop menstruation which is unfortunate because they did not understand that menstruation was a natural process that could only stop because of age or a physical condition (Bhartiya 2013).

A study done by Thakur et al (2014) in Mumbai India it was observed that 92% of menstruating girls and women confirmed religious and social restrictions. The results showed that many families celebrated the first menarche ceremony and observed social restrictions. Menstruating women were regarded as unclean and untouchable and were not expected to participate in normal activities of life such as leaving home, going to work, school and places of worship and do exercises. They concluded that many of the traditions and taboos about menstrual cycle had originated from religious beliefs worldwide (Thakur et al 2014).

2.7 Summary of the literature review

The review looked at studies that focused on what menstrual cycle is and what it means to the girl child, the stages of menstrual cycle and their implications as well as the sources of information concerning menstrual cycle to the young people and the teachers. The review also looked at the studies that focused on the students' and the teachers' understanding of menstrual cycle and the relationship between the students' and the teachers' understanding as well as the various factors that influence how they understand menstrual cycle such as age, gender, level of education, socio- economic status and religion from global, African and Kenyan perspectives. The chapter has also been analyzed by providing literature on the various aspects of the study as shown in the objectives. The review has enabled the researcher to provide sufficient information regarding the proposed study.

In Kenya, various studies have been conducted especially on adolescent sexual and reproductive health for example by the Kenya Demographic and Health Survey (2014) and Karimi (2015) Challenges faced by teenage mother students on returning

to Primary School. Globally many studies such as Echendu et al (2008) Perceptions and Practices on Menstruation in Nigerian, Ehlers, (2003), 'Teenager mothers' information and thoughts of contraceptives in South Africa, Koff et al(2008) Conceptions and Misconceptions of the Menstrual Cycle. To the best of the researcher knowledge, currently, there exists minimal research on the students' and teachers' understanding of menstrual cycle in Kenya. This therefore necessitates for the need to discuss further the variables involved in the current study so as to add more knowledge on limited existing one.

2.8 Theoretical Framework

This section l focused on the theory of constructivist whose major theme is that learning is a vigorous progression in that students create fresh thoughts and concepts depending on existing precedent information. Theoretical framework was also discussed under one of the prevention theories known as Health Belief Model.

2.8.1Constructivist Theory

This theory was first proposed by Jerome Brunner one of the most important psychologists of the 20th century, particularly in the field of education where his impact was most intensely felt. Piaget and Lev Vygotsky ideas influenced Brunner into writing books on "The Process of Education" and "Towards a Theory of Instruction" in 1961 and 1966 respectively, in which Brunner formulated educational theory called constructivism. Constructivist theory also referred to as Instruction theory by Brunner (1966) states that comprehension is a vigorous progression in that disciples create fresh thoughts and concepts depending on existing precedential information. He further explained that the aim of the learner is to select and transform in turn constructs hypotheses and makes decisions depending on mental structures. Mental structure such as schema and mental models offer connotations and associations to experiences and allow people to go further than the knowledge given.

According to instruction theory the trainer encourages learners to find out ideas on their own. Teachers and students take on vigorous discussions. The assignment of the tutor is to interpret knowledge to be cultured into a set-up suitable to the learner's existing condition of perceptive. Set of courses are prepared in a coiled method so as the trainee persistently builds on what he or she had already learned. According to

Bruner (1966) the theory of instruction concerns itself with tendency towards knowledge, the manner in which knowledge is structured for ease of understanding by the student, the most useful sequences of presenting the knowledge and finally the application of rewards and punishments. Simple, new propositions and methods of exploiting information results into high-quality methods for structuring knowledge for ease of understanding.

Constructivism theory exploits three principles in that training must include experiences and contexts that make the student ready and able to study in other words readiness. Instruction must also be structured to resourcefully be used by the student in other words spiral organization. Brunner (1966) explained that schooling should be shaped to speed up extrapolation of the knowledge provided. According to Bruner, training is more essential, useful and interesting for students if they focus on explaining the structure of the subject.

According to Brunner's theory Learning is actively created by the individual in that experience is seen or observed as learning if the students construct the definition of something that makes insight to them. Also learning is both a person and a cultural process whereby meaning is limited by learning within the ideas with others in natural contexts. For example the case of menstrual cycle understanding is determined by teachers, mothers, friends and peers, scientific explanations and school curriculum. Furthermore learning is self-regulated in that the individual's training is defined by the inborn tendencies and external constituents that impact them such as age, gender, level of education, socioeconomic status, and religion and teachers experience for understanding knowledge about menstrual cycle. If the student is motivated and sees him or herself having a significant part in learning knowledge about menstrual cycle then he will have the vast result than the student who does not (Seigel 2004).

2.8.2 Health Belief Model (HBM)

The Health Belief Model (HBM) is a psychological model that was first developed in the 1950s by social psychologists Hochbaum, Rosenstock and Kegels. According Becker et al (1978) and Rosenstock (1974) the Health Belief Model was applied to a large array of wellbeing behaviors and area under discussion such as deterrent health behaviors contraceptive practices. HBM is well applied in challenges of altering

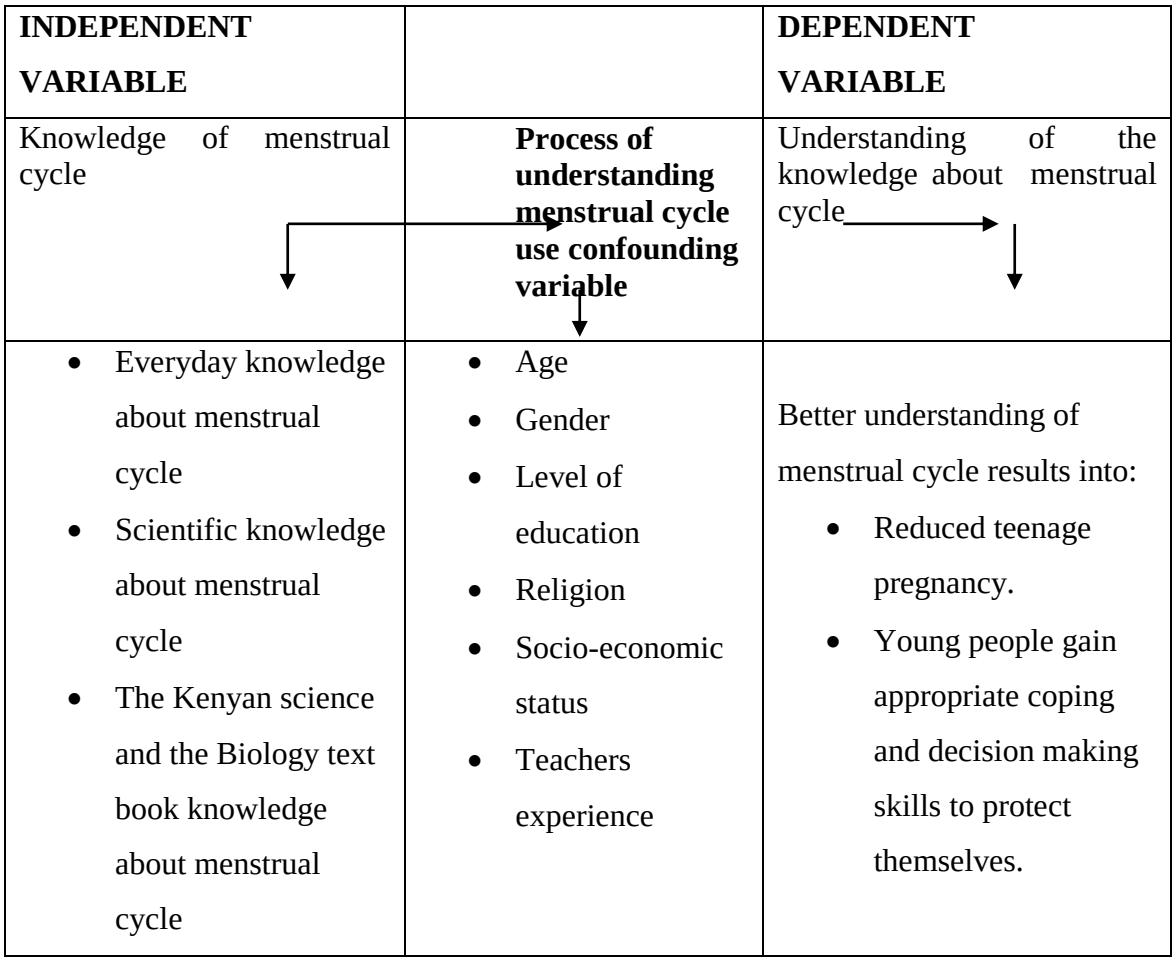
regular harmful actions, like being sexuality active while still young that results into teenage pregnancy (Becker et al (1978) and Rosenstock 1974).

According to Becker, Radius and Rosenstock (1978) and Rosenstock (1974) the Health Belief Model theory of prevention in this case teenage pregnancy helps the young people prevent unintended pregnancy. The Health Belief Model has five constructs that is perceived threat and net benefits, supposed vulnerability, supposed cruelty, supposed profits, supposed barriers account for a person's "willingness to take action and self-efficacy that accounts for individual's self-assurance in the capability to productively achieve an action in this case prevent teenage pregnancy by taking action not to get pregnant by use safe days within the menstrual cycle.

In conclusion the two theories Constructivist and Health Belief Model complement each other in that while Constructivist helps students and teachers to understand menstrual cycle thus enhancing their knowledge in menstrual cycle Health Belief Model help them prevent teenage pregnancy especially with self efficacy concept.

2.9 Conceptual Framework

Figure 1: Conceptual framework



CHAPTER THREE
METHODOLOGY

3.0 Introduction

In this chapter the researcher gave a description of the design of the study that was adopted and the reason for its adoption are presented followed by an explanation of the target population and sampling procedure that was used to define the sample of the study. Data collection tools and techniques were also given together with a description on how the collected data was analyzed and presented.

3.1 Research Design

This study employed school-based mixed-method approach that was Quantitative and qualitative research methods. The approach was adopted because it involved extensive analysis of the variables of the study. This research design also provided a complete and accurate wider picture of the phenomenon being studied.

3.2 Method

This study employed case study research method with a school-based structured multiple-choice questionnaire that was administered to female and male students and teachers of both genders to quantify their understanding of menstrual cycle. The multiple-choice questionnaire was used to compare the findings between the students' and the teachers' understanding of the subject matter. Section A of the structured multiple-choice questionnaires was used to acquire information on the background of the participants and section B included the information associated to the objectives.

A pre-test was conducted before the main study and the questionnaire was modified depending on the outcome. It was efficient in collecting original data from a wide range of respondents and provided opportunity for the researcher to collect systematic information. Qualitative methods included FGDs and KI interviews among the female and male students, teachers and head teachers to explore the students' and teachers' understanding of menstrual cycle. The qualitative data help to fill gaps in the results from the multiple choice of questionnaire and to study how elements like age, gender, education level, socio-economic status and teachers' experience contributed to the students' and the teachers' understanding of menstrual cycle.

3.3 Target 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, Kenya. There were a total of seven hundred and twenty six (726) students of both genders in the two schools. Of the seven hundred and twenty six, Shikomari secondary school had a total of four hundred and thirteen (413) students where two hundred and ten (210) were males and two hundred and three (203) were females. Makunga secondary School was the second school with a total of three hundred and thirteen (313) students in which one hundred and thirteen (113) were male and two hundred (200) were female. The teachers in the above-mentioned schools aged twenty-four (24) years and above formed the second part of the population in that there were twenty (20) teachers in each school making a total of forty (40) teachers.

3.4 Sample size

The sample size of eighty (83) students and twenty (20) teachers was sufficient enough to give a true reflection of the students' and teachers' understanding of menstrual cycle. In addition, the focus group discussions (FGD) of four to eight members of equal number of students from each class from one to four were conducted. There were three focus groups per school comprising of male and female students and teachers of mixed genders. Key informant's interviews (KII) were also conducted with the head and deputy head teachers of the two schools bringing the number to four key informants. A total of one hundred and four (103) participants formed the sample size.

Sample size determination

The sample size was determined using the Fishers formula for determination of sample size (Fisher et al 1999 as cited by Mugenda and Mugenda 2003):

$$n = \frac{Z^2 * p * q}{d^2}$$

Where;

n = desired sample size (if the target population is over 10,000)

Z = the standard normal deviate at 95% confidence interval (= 1.96).

P = the proportion in the target population estimated 50%

Q =1-P

d= level of precision around estimated prevalence (set at ±5% or 0.05).

$$n = \frac{1.96^2 * 0.5 * 0.5}{0.05^2}$$

$$n = 384$$

Since the population of the target population (Total estimated number is estimated to be (less than 10,000)). The sample was adjusted using

$$\boldsymbol{n_{\mathrm{O}} = \frac{n}{1 + \frac{n-1}{N}}}$$

$$n_0 = \frac{384}{1 + {}^{384-1}/_{140}} = 102.8 \cong 103$$

The desired sample size therefore was 103

The sample size was stratified as follows:

Groups	**Total Number**	**Total Sample size**
Teachers	40	20
Students	760	83

3.5 Sampling Procedure

Stratified random sampling school-based technique was used to select the required sample. A representative sample of about forty students was selected in which five boys and five girls from each class from form one to four in each of the two-secondary school. A total sample size of eighty students and twenty (20) teachers did

the multiple-choice questions and it was believed that it was sufficient enough to give quantitative information on students' and teachers' understanding of menstrual cycle.

In addition, the focus group discussions (FGD) of four to eight members of equal number of students from each class from form one to four were conducted. There were three focus groups per school comprising of male and female students and the teachers of mixed genders. Key informants (KI) interviews were also conducted with the head and deputy head teachers of the two schools. The groups were intentionally chosen after consultations between the researcher and the teachers. According to the researcher these groups and informants provided the required qualitative information on the students' and the teachers' understanding of menstrual cycle to fill in the gaps of the quantitative method.

3.6 Research Instruments

The research instruments are the tools that were used to collect the required data. The researcher used three types of tools as discussed below.

3.6.1 Interview guide or schedule.

The interview schedule developed by the researcher guided by the aspects of the dependent variables being examined were filled by the researcher while conducting key informant interviews with the deputy and head teachers of the selected schools. Refer to appendix V.

3.6.2 Focus group discussion guide

Short structured questionnaire consisting of short and simple questions were developed to guide the focus group discussions of various groups i.e. Male students, female students and the teachers of mixed gender. Refer to appendices III and IV.

3.6.3 Multiple choice questionnaire

A structured multiple-choice questionnaire was administered to the students both males and females and teachers of both genders in order to enhance maximum data collection and generation of quantitative data. The teachers and the students did the same questionnaire in order to compare their understanding of menstrual cycle. It was kept as simple as possible to encourage participation. Refer to appendix II.

3.7 Data Collection Procedure

A structured questionnaire was used for the quantitative survey to elicit information related to the objectives. The questionnaire was created based on experience of the pre test that was conducted before the main study. Both the students and teachers did the same multiple choice questionnaires in the selected schools. The questionnaires were divided into two sections. Section A gave the students and the teachers' bio data and section B consist of statements that the respondents checked the box that best reflected their view on students' and teachers' understanding of menstruation cycle. Focus group discussions were carried out with the students to get their opinions on learning of their menstruation cycle and menstruation. A semi-structured procedure was prepared for FGD and KI questionnaire. The informed consent was taken from each participant before filling the questionnaire and start of interview.

All tools were refined and adopted following extensive pre-testing with teachers and students. To observe cultural sensitivities, female researcher assistants conducted questionnaires, interviews and FGDs with female students and teachers while male researcher assistants conducted the FGDs with male students and teachers. Copious note-taking took place throughout discussions by a trained note-taker who was seated within circle of students and teachers of the FGDs. Note-taking provided a means to record valuable, unspoken and aspects of the discussions.

3.8 Data Analysis

All FGDs and KI interviews were manually recorded and then Qualitative data was analyzed thematically by the researcher and one research assistant. The Researcher and the research assistant individually coded the manually recorded information to review the coding frame refined it and added new codes as was required. These codes formed the final coding framework. The framework was reviewed by the researcher and the research assistant to identify key themes and sub-themes and relationships between them. Quotes were recorded to illustrate key themes. Qualitative data were analyzed through narrations and models and presented by use quotation in text box.

Quantitative data by use of questionnaires was completed in hard copy and responses entered into statistical analysis system SPSS version 20. The researcher used descriptive statistics that is measures of central tendency such mean and frequency to analyze data collected for the question on the students' and teachers' sources of

information and also linear correlation so as to evaluate the relationship between the students and the teachers sources of information. Inferential statistics were used to infer the sample results such as chi square, regression and linear correlation to establish correlation between students' and teachers' understanding of menstrual cycle. For the question on students' understanding and teachers' understanding of menstrual cycle the researcher used both descriptive statistics such as means and frequencies and inferential statistics that is spearman correlation, logistic regression (ANOVA) and Chi Square to establish the relationship between the several confounding variables discussed like age, gender, religion, level of education, socio-economic status and the teachers' experience with their understanding of menstrual cycle.

3.8.1 Scientific understanding of menstrual cycle Data Analysis

The scientific understanding of students and teachers was evaluated by use of a multiple choice questionnaire whose focus was on the major terms in the concepts 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 above method of scoring resulted in different categories of understanding as illustrated below:

Categories of Understanding

According to the terms involved in the concept of menstrual cycle the researcher came up with three categories of understanding based on the school Kenyan school education system i.e. Basic understanding, Intermediate understanding and full comprehensive understanding of menstrual cycle.

Justification of the categories

Basic understanding was considered to be the knowledge acquired at Primary school level in which science subject is taught and the science of the female reproductive system was covered in which menstrual cycle was only mention in passing as from class six (Nyamosi et al 2015, KBL 2014). Intermediate understanding was considered to be the secondary school biology that covers menstrual cycle in Biology from form three according to Kenya Literature Bureau (KBL2016). Full comprehensive understanding comprises university and teachers' college scientific knowledge expected to be gained by teachers during graduate and teachers training

where (Chandra-Mouli and Patel (2017) who carried out a study on understanding the knowledge of menstrual cycle in low and middle-income countries (LMIC) recorded that 70–90% of school teachers who had been trained to use various strategies especially play approaches to pass menstruation knowledge to their students found it rather easy and confident to discuss menstrual cycle with their students. 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.

3.8.1.1 Basic understanding of menstrual cycle

In this category the researcher analyzed the basic understanding of menstrual cycle based on the definition of menstrual cycle whose major terms were assigned one point if the respondent could easily describe them and zero (0) if the respondents could not describe the terms. The major terms in the definition were monthly cycle (1), changes in the ovaries (1), changes in the lining of the uterus (1) and the shedding of the endometrium (1). The basic understanding also involved respondents being able to identify the female reproductive system and its anatomy. The major terms were identification of 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 in the basic understanding the respondents were required to know how the start of menstruation is referred to as menarche (1). Basic understanding composed of (14) Variables.

3.8.1.2. Intermediate understanding of menstrual cycle

In this category the researcher analyzed the intermediate understanding of menstrual cycle as comprising of definition of menstrual cycle whose major terms were assigned one point if the respondent could easily describe them and zero (0) if the respondents could not describe the terms. The major terms in the definition are monthly cycle (1), changes in the ovaries (1), changes in the lining of the uterus (1) and the shedding of the endometrium (1). The intermediate understanding also involved identification of female reproductive system and its anatomy. The major terms were correct identification of 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), start of menstruation is referred to as menarche (1), respondent ability to identify the number of phases (1) involved in the menstrual cycle and the average length of menstrual cycle (1). The phases of menstrual cycle were menstruation (1), follicular (1), ovulation (1) and luteal (1). In this category the respondent who demonstrated the understanding of the above scored one point in every term and the one who did not scored zero (0). Intermediate understanding composed of (20) Variables

3.8.1.2.3 Full comprehensive understanding of menstrual cycle

Full comprehensive understanding meant that the respondents understood fully the scientific description of menstrual cycle, phases and the relationship with the hormones controlling female reproductive system. In this category the researcher analyzed definition of menstrual cycle whose terms were assigned one point if the respondents could easily describe them and zero (0) if the respondents could not describe the concepts. The major terms in the definition are monthly cycle (1), changes in the ovaries (1), changes in the lining of the uterus (1) and the shedding of the endometrium (1). Identify the female reproductive system and its anatomy. The major terms were correct identification of 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), start of menstruation is referred to as menarche (1) and the ability to identify the number of phases (1) involved in the menstrual cycle and the average length of menstrual cycle (1). The phases of menstrual cycle were menstruation (1), follicular (1), ovulation (1) and luteal (1). The respondents also needed to understand all the hormones that control menstrual cycle events. The hormones involved in the control of menstrual cycle events were estrogen (1), progesterone (1), luteinizing (1) and follicle stimulating (1). Full comprehensive understanding composed of (24) Variables.

The study allowed 0.05 as the minimum level of statistical significance of which is the recommended value for social sciences. The data collected was organized, tabulated and analyzed using descriptive percentages and the presentation done through tables and summary graphs just as in quantitative research method guided by (Mugenda and Mugenda 2003, Kabiru and Njenga 2009).

3.9 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 participants were free to stop participation 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 school to participate. No personal identifying details were recorded on questionnaires or interview notes.

CHAPTER FOUR
DATA ANALYSIS AND PRESENTATION

4.0 Introduction

In this chapter the researcher presented data on students' and teachers' understanding of the menstrual cycle from two mixed secondary schools in Kakamega county, their sources of information about menstrual cycle and three scientific categories of understanding that is basic, intermediate and full comprehensive understanding of menstrual cycle concept. The researcher also presented data on the students' and teachers' attitudes, beliefs and perceptions which contribute much to their understanding of menstrual cycle from focus group discussions and key informant interviews. The study covered a hundred and three (103) respondents who participated in multiple choice questionnaires, six focus group discussions three per school and four key informant interviews two per school.

4.1 Demographic characteristics

A total of 103 respondents completed the self-administered multiple choice questionnaire (Table 1). Of these 82 were students of both genders in a ratio of 1:1 from form one to four. (50%) were females and the other 50% were males and 90% of the girls had reached menarche. The study included twenty one teachers teaching the students again of both genders in the ratio of 1:1 together with the principals and deputy principals in the two sampled schools as shown in table 1 through 2 below. 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 = 0.001and that of teachers as $\overline{X}$= 28.86 ± (5.332), F= 16.673, P= 0.001.

Table 1: Students' demographic characteristics

	Students' n (%)		Teachers' n (%)	
Gender	**Frequency (n)**	**Percent (%)**		
• Male	39	47.6	10	47.6
• Female	43	52.4	11	52.4
School				
• Makunga	42	51.2	9	42.9
• Shikomari	40	48.8	12	57.1
General performance • Range (12, 33)	Mean(SD) 20.96(4.7)			
Age (years)				
• `10-12	12	14.6		
• 13-15	60	73.2		
• 16-18	10	12.2		
• 19 plus				
Student class				
• Form 1	23	28.0		
• Form 2	16	19.5		
• Form 3	21	25.6		
• Form 4	22	26.8		

Parents employment	**Employment**	**Self Employed**	**Others**
Mothers	11(13.4)	58(70.7)	13(15.9)
Fathers	17(20.7)	49(59.8)	16(19.5)

Table 2: Teachers' demographic characteristics

Variable	Student		Teacher	
	Frequency (n)	**Percent (%)**		
Residence				
• Urban	6	7.3	5	23.8
• Rural	70	85.4	16	76.2
Nationality –All Kenyans				
Ethnic Group				
• LUHYA	81	97.5		
• LUO	1	1.2		
Religion				
• Muslim	6	7.3	2	9.5
• Christian	76	92.7	19	90.5

Age (years)	Frequency (n)	Percent (%)
26-30 years	4	19.0
30-40 years	8	38.1
41-50 years	6	28.6
50 + years	2	9.5
Marital status		
Single	1	4.8
Married	19	90.5
Widowed	1	4.8
Education Level		
Certificate	1	4.8
Diploma	1	4.8
Graduate	17	81.0
Postgraduate	2	9.5
Income per Month (Kshs.)		
10000-20000	3	14.3
20000-30000	3	14.3
31000-40000	7	33.3
41000-50000	3	14.3
51000-100000	5	23.8
Ethnic Group		
LUHYA	19	90.4
KALENJIN	1	4.8
LUO	1	4.8
Years of experience		
1-5 years	8	38.1
6-10 years	5	23.8
11-15 years	1	4.8
16 + years	7	33.3

4.2 Students sources of information regarding menstrual cycle

The first objective was to establish 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 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 Russian Orthodox Christian. While participants were agreeing with Bhartiya (2013) they had the following to say during focus group discussions which made the church not to be a source of information among students because they were 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.

Table 3: Students' sources of information regarding menstrual cycle

Source of information	Frequency (n)	Percent (%)
School(Teacher)	15	71.4
Church(Pastor or Reverend)	-	-
Handbills and leaflets	3	14.3
Banners and posters	2	9.5
Family members(e.g. parents, sisters)	3	14.3
Friend and peers	3	14.3
Movies, cinema and film	3	14.3
Health workers (e.g. doctors, nurses etc.)	4	19.0
Television	7	33.3

4.3 General information on menstrual cycle

From table 4 below on general information 42 (50%) of female student respondents had already started getting their periods. Of these 12 (14.6%) stated that they had started between 11 and 13 years while majority 24 (29.3%) started between 14 and 15 years whereas just handful 5 (6.1%) started above 15 years. On assessing whether female students had received information prior starting their period 35 (33.3%) said yes and 7 (8.4%) said no but while evaluating if they had adequately been prepared for the first period 23 (27.4%) said No while 19 (22.6%) said Yes meaning that most of the young people are not always adequately prepared for menarche. These findings were in agreement with the focus group discussions from students and female key informant as illustrated below;

Key informant 2 " I did not know what was happening so I went very early in the morning to wash in the river twice without the blood stopping until I got late to school. I had to use a piece of blanket and rushed to school.

Female student Red "I thought I had injured myself while a sleep but where the blood was coming from I got scared to tell my mother. I told my elder sister who explained and gave me some cotton wool to use.

The findings are consistent with (Koff and Rierdan 2008 and 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 got 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.

Table 4: Students' and teachers' general information regarding menstrual cycle

Variable	**Student**		**Teacher**	
	Frequency (n)	**Percent (%)**	**Frequency (n)**	**Percent (%)**
Have you started your period	41	50.0	11	50
At what age did you start your period				
11 to 13	12	14.6	2	19.0
14 to 15	24	29.3	4	23.8
Over 15	5	6.1	1	4.8
Receive any information about the menstrual cycle prior to starting your period				
Yes	35	42.7	7	41.6
No	7	8.5	4	8.4
Adequately prepared for your first period				
Yes	19	22.6	4	19.0
No	23	27.4	7	33.3

4.4 Scientific understanding of menstrual cycle

The scientific understanding of menstrual cycle was evaluated using a multiple choice questionnaire comprising of fifty questions covering the major terms in the concept of menstrual cycle. The respondents' responses were evaluated by use of binary system of scoring in that if a respondent mentioned one of the correct terms in the concept of menstrual cycle would be awarded one (1) score and if they failed to mention the correct term they would be awarded zero (0). It involved a number of terms in that for every term that respondents mentioned or got it right in their response to the achievement test instrument they would be awarded one(1) score. The levels of understanding graduated as we moved towards the full comprehension of the concept

of menstrual cycle and the levels graduated as they comprised terms of the previous level to full comprehensive understanding of menstrual cycle concept.

A combination of the terms generated full comprehensive understanding of the concept of menstrual cycle. However the level of understanding kept on reducing as the respondents failed to identify the key terms in the concept of the menstrual cycle thereby generating different levels of understanding. Both the teachers and students were evaluated using the same terms and ratings to allow the researcher to compare their understanding of menstrual cycle.

4.5 Students' Understanding of menstrual cycle

The second objective of the study was to establish the students' understanding of menstrual cycle which was evaluate under three categories that is basic, intermediate and comprehensive understanding.

4.5.1 Students' basic understanding of menstrual cycle

This category of understanding it is the most basic that primary school students undertake and involves knowledge on the female reproduction system, parts of female reproductive system and some knowledge on definition of menstrual cycle (Nyamosi et al 2015, KBL 2014). It comprised of fourteen (14) terms in whose scores were grouped in four for ease of further categorizing the respondents in various sub titles under every category. 0 meant no understanding; 1-5 meant the respondents had 1-5 terms right corresponding to basic simple understanding of the basic understanding, 6-10 terms right meant respondents had achieved intermediate basic understanding and 11-15 terms right the respondents had achieved basic comprehensive understanding in which case each term was scored as one (1). Refer to table 5.

According to the study, 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

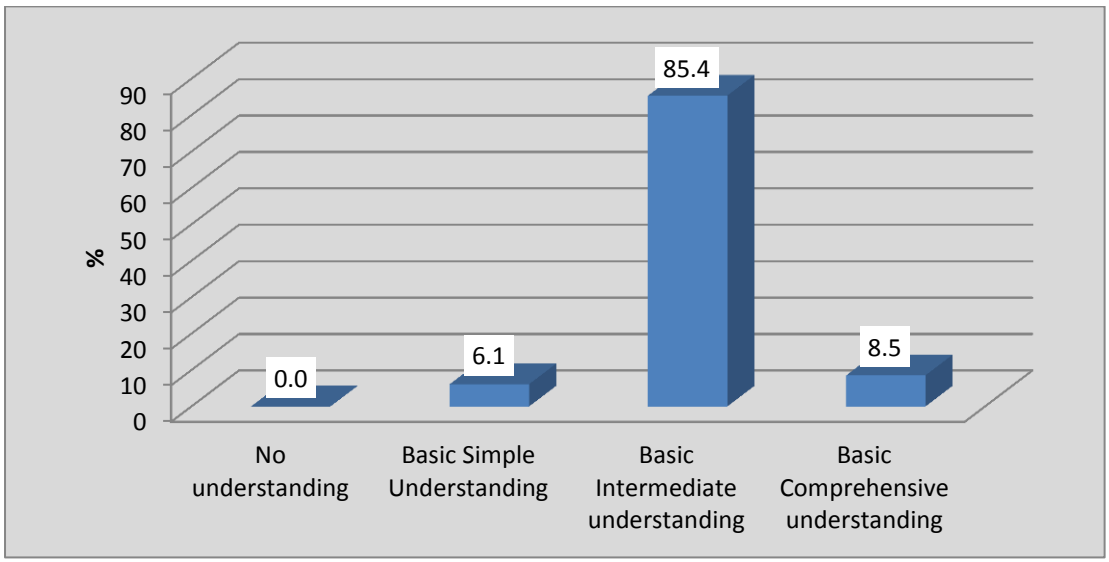
about the most fertile period a woman can get pregnant as demonstrated in their sentiments below:

> *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*

Table 5: 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 2: Students' basic understanding of menstrual cycle



4.5.2 Students' Intermediate understanding of menstrual cycle

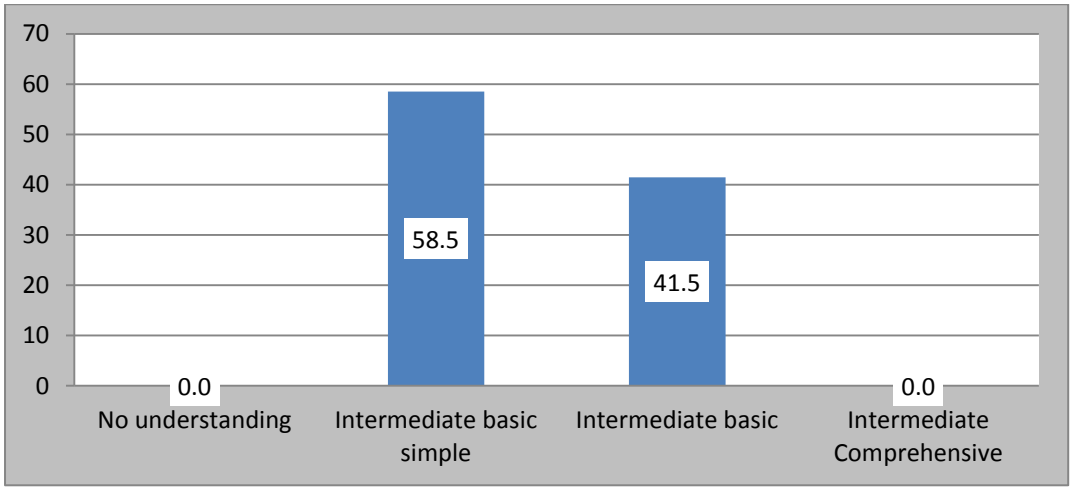
This category of understanding is the intermediate which is gained in secondary schools where students are taught female reproduction system, parts of female reproductive system, definition of menstrual cycle, phases of the menstrual cycle and basic hormones that control menstrual cycle but for the sake of systematic assessments the researcher excluded hormones in this level of understanding. It comprised of twenty (20) terms in the above areas of the menstrual cycle concept. The terms again were put in four groups where 1-5 terms right represented no understanding, 6-10 terms right - Intermediate basic understanding, 11-15 terms right – Intermediate understanding and 16-20 terms right– Intermediate comprehensive understanding. Every correct term was scored as one (1). Refer to table 6

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 6: 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 3: Students' intermediate understanding of menstrual cycle



4.5.3 Student's full comprehensive understanding of menstrual cycle

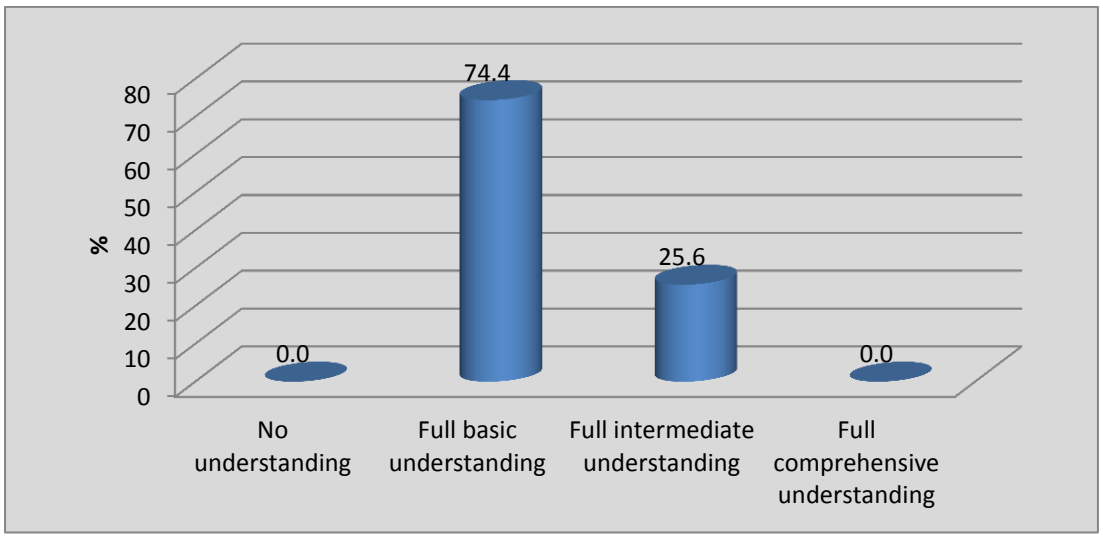
This category of understanding is the type gained at college or university level where students are taught female reproduction system, parts of female reproductive system, definition of menstrual cycle, phases of the menstrual cycle, all hormones that control menstrual cycle and how to relate them in one whole. Basically it is the scientific understanding of menstrual cycle that has been researched and approved to be taught to teacher training colleges and universities. It comprised of twenty four (24) terms which were grouped again into four groups and divided into four sub categories whereby 1-6 terms right meant no understanding, 7-12 terms right meant full comprehensive basic understanding, 13-18 terms right meant full comprehensive Intermediate understanding and 19-24 terms right meant Full comprehensive understanding. In this category the researcher increased the class width of 5 that had been maintained in the basic and intermediate understanding to 6 to evaluate how many respondents could have the comprehensive kind of understanding as shown in table 7 below.

None of the students had no understanding and full comprehensive understanding, with majority 61 (74.4%) of respondents having full comprehensive basic understanding and 21 (25.6%) full comprehensive intermediate understanding.

Table 7: Students' 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 4: Students' full comprehensive understanding of menstrual cycle



4.5.4 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 8 below.

Table: 8 Factors influencing students' overall understanding of menstrual cycle

Student understanding	Mean ±SD	F	P-Value
Gender	1.47 ±0.503	3.228	.046S
Age	2.98 ±1.191	4.711	.013
Class (level of education)	2.59 ±1.191	3.939	.025
Religion	1.94 ±0.244	0.336	.716
Father Employment	1.84±0.366	0.281	.756
Mother Employment	1.75±0.436	0.186	.831

4.6 Teachers' Understanding of menstrual cycle

The third objective was to examine teachers' understanding of menstrual cycle which was evaluated in three categories that is basic, intermediate and full comprehensive understanding.

4.6.1 Teachers' Basic understanding of menstrual cycle

This category of understanding is the most basic that primary school students undertake and involves knowledge on the female reproduction system, parts of female reproductive system and some knowledge on definition of menstrual cycle (Nyamosi et al 2015, KBL 2014). It comprised of fourteen (14) terms in whose scores were grouped in four groups for ease of further categorizing the respondents in various sub titles under every category in that 0 meant no understanding; 1-5 meant the respondents had 1-5 terms right corresponding to basic simple understanding of the basic understanding, 6-10 terms right meant respondents had achieved intermediate basic understanding and 11-15 terms right the respondents had achieved basic comprehensive understanding in which case each term was scored as one (1). Refer to table 9.

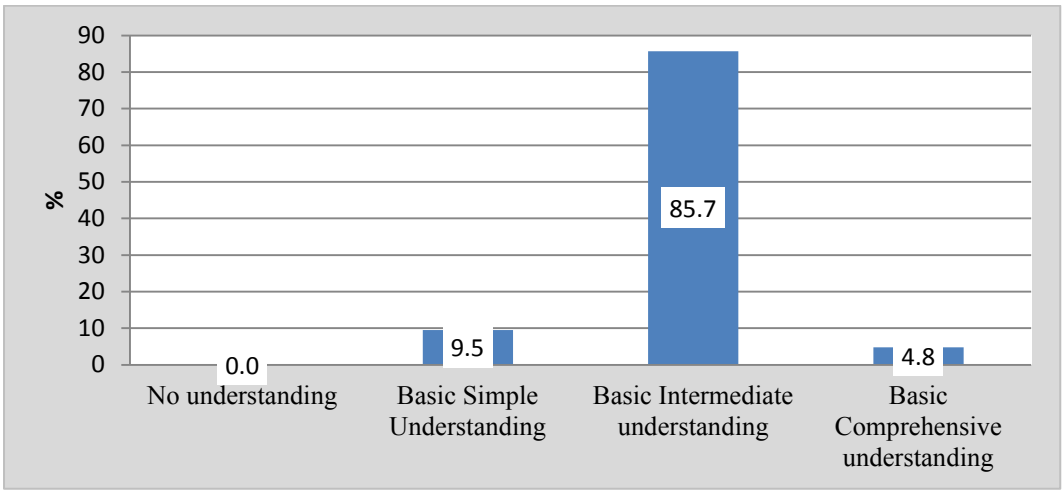
Most of the teachers 18 (85.7%) had basic intermediate understanding, followed 2 (9.5%) with basic simple understanding, 1 (4.8%) basic comprehensive understanding with none of the teachers having zero understanding of the female reproductive system and definition of menstrual cycle. In addition the teachers' responses during focus group discussion demonstrated their limited understanding of menstrual cycle as illustrated below:

> *Do teachers have enough information about menstrual cycle? Teacher C: Not quite, unless those who teach biology.*
>
> *Another Teacher E: Not quite I lack information on various phases, hormones and the safe period when fertilization cannot occur*

Table: 9 Teachers' basic understanding of menstrual cycle

Variable	Freq. (n)	Percent (%)
No understanding	0	0.0
Basic Simple Understanding	2	9.5
Basic Intermediate understanding	18	85.7
Basic Comprehensive understanding	1	4.8

Figure 5: Teachers' Basic Understanding of menstrual cycle



4.6.2 Teacher's Intermediate understanding of menstrual cycle

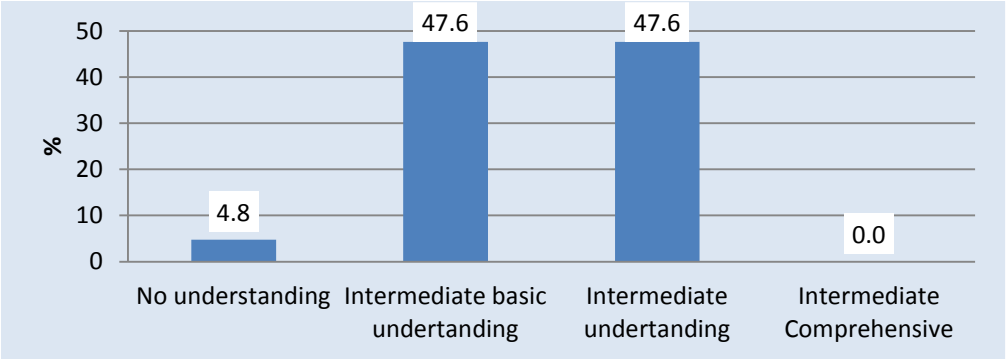
This category of understanding is the intermediate which is gained in secondary schools where students are taught female reproduction system, parts of female reproductive system, definition of menstrual cycle, phases of the menstrual cycle and basic hormones that control menstrual cycle but for the sake systematic assessments the researcher excluded hormones in this level of understanding. It comprised of twenty (20) terms in the above areas of the menstrual cycle concept. The terms again were put in four groups where 1-5 terms right represented no understanding, 6-10 terms right - Intermediate basic understanding, 11-15 terms right – Intermediate understanding and 16-20 terms right– Intermediate comprehensive understanding. Every correct term was scored as one (1). Refer to table 10

In this category 10 (47.6%) of the teachers demonstrated intermediate basic understanding and intermediate understanding with only 1 (4.8%) having no understanding and none of the teachers had intermediate comprehensive understanding.

Table 10: Teachers' intermediate understanding of menstrual cycle

Variable	%	Freq. (n)
No understanding	4.8	1
Intermediate basic understanding	47.6	10
Intermediate understanding	47.6	10
Intermediate Comprehensive understanding	0.0	0

Figure 6: Teacher's Intermediate understanding of menstrual cycle



4.6.3 Teachers' Full Comprehensive understanding of menstrual cycle

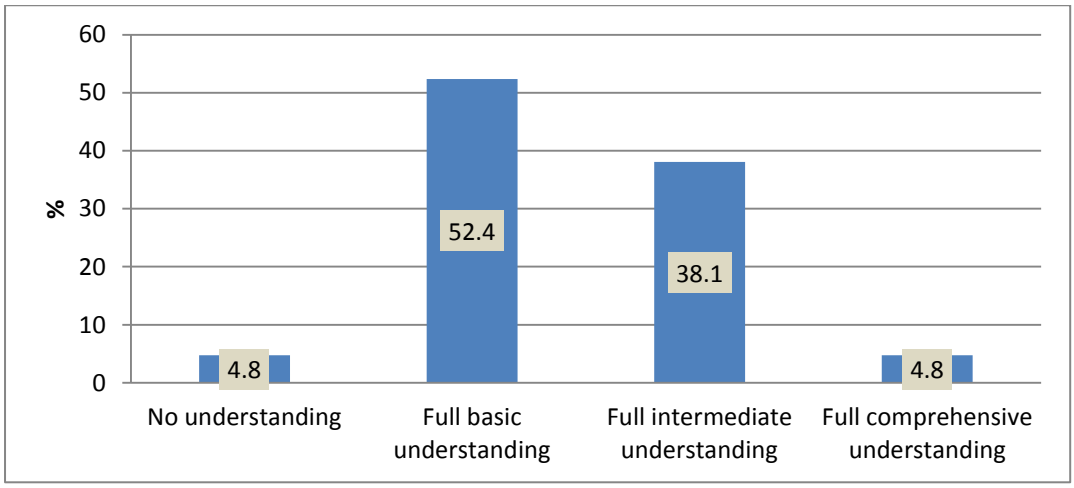
This category of understanding is the type gained at college or university level where students are taught female reproduction system, parts of female reproductive system, definition of menstrual cycle, phases of the menstrual cycle, all hormones that control menstrual cycle and how to relate them in one whole. Basically it is the scientific understanding of menstrual cycle that has been researched and approved to be taught in teacher training colleges and universities. It comprised of twenty four terms whereby they were grouped again into four groups and divided into four sub categories in that 1-6 terms right – no understanding, 7-12 terms right- full comprehensive basic understanding, 13-18 terms right – full comprehensive Intermediate understanding and 19-24 terms right – Full comprehensive understanding. In this category the researcher increased the class width of 5 that had been maintained in the basic and intermediate understanding to 6 to evaluate how many respondents could achieve comprehensive kind of understanding as shown in table 11

Over half 11 (52.4%) of the respondents achieved full comprehensive basic understanding, followed by 8 (38.1%) full comprehensive intermediate understanding, 1 (4.8%) with full comprehensive understanding and 1 (4.8%) with no understanding at all of full comprehensive understanding of menstrual cycle.

Table 11: Teachers' full comprehensive understanding of menstrual cycle

Variable	Frequency	Percent
No understanding	1	4.8
Full comprehensive basic understanding	11	52.4
Full comprehensive intermediate understanding	8	38.1
Full comprehensive understanding	1	4.8

Figure 7: Teachers' Comprehensive understanding of menstrual cycle



4.6.4 Factors influencing Teachers' 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 teachers' understanding of menstrual cycle. Gender with $\overline{X}$= 1.22± (0.428), F= 6.546, P= 0.013 was the only factor that was significant among the teachers. Age with $\overline{X}$= 3.00 (±0.686), F=0.022, P= 0.882, level of education with $\overline{X}$= 2.83± (1.295), F= 1.013, P=0.318, Religion with $\overline{X}$= 1.94± (0.236), F= 0.020 P= 0.888 and socio-economic status that is income per month with $\overline{X}$= 1.72± (0.4361), F= 0.100, P= 0.753 were not significant with their P- values remaining higher than 0.05 used in Psychology as illustrated in table 12.

Table: 12 Factors influencing Teachers' overall understanding of menstrual cycle

Teacher Understanding	Mean ±SD	F	Sig.
Gender	1.22 ±0.428	6.546	0.013
Age	3.00±0.686	0.022	0.882
Level of education	2.83±1.295	1.013	0.318
Religion	1.94±0.236	0.020	0.888
Income Per Month	1.72±0.461	0.100	0.753

4.7 Correlation between students' and teachers' understanding of menstrual cycle

The correlation between students' and teachers' understanding was analyzed on the basis of the three categories of understanding that is basic, intermediate and full comprehensive understanding. Both the students 70 (85.4%) and teachers 18 (85.7%) had higher basic intermediate understanding with a difference of only 0.3% between the two groups with none of the respondents having no understanding. For intermediate understanding 48 (58.5%) students and 10 (47.6) teachers had intermediate basic understanding while 34 (41.5%) students and 10 (47.6) teachers had intermediate understanding but none of the students and teachers had no understanding and intermediate comprehensive within the intermediate understanding. For full comprehensive again more than half of the participants 61 (74.4%) students and 11 (52.8%) teachers had full comprehensive basic understanding while 21 (25.6%) students and 8 (38.1%) teaches had full comprehensive intermediate understanding. Only 1 (4.8) teacher had full comprehensive understanding while none of the students had no understanding of full comprehensive understanding and full comprehensive understanding. Surprisingly there was 1 (4.8) teacher who had no understanding of the full comprehensive understanding. There is a monotonic relationship between teachers' comprehensive understanding and Students' comprehensive understanding with a Pearson correlation of r=1 and a p-value of 0.395 (P>0.05) which was statistically insignificant**.** As the teachers' understanding reduced towards full comprehensive understanding the students' full comprehensive understanding was the lowest but the relationship was not necessarily linear. Refer to table 13 below.

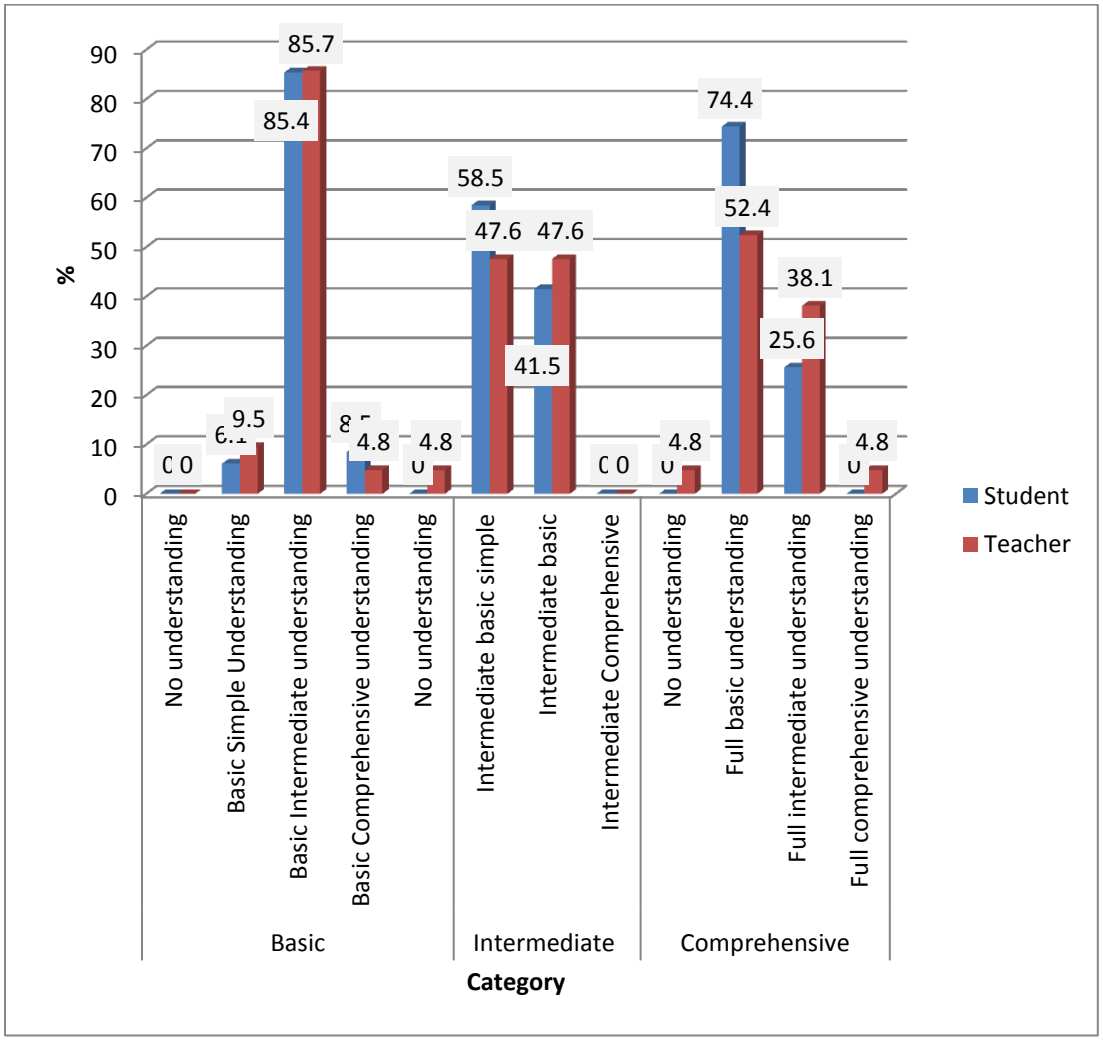
Table: 13 Correlation between students' and teachers' understanding of menstrual cycle

Category	Levels of Understanding	Student	Teacher
Basic	No understanding	0.0	0.0
	Basic Simple Understanding	5 (6.1%)	2 (9.5%)
	Basic Intermediate understanding	70 (85.4%)	18 (85.7%)
	Basic Comprehensive understanding	7 (8.5%)	1 (4.8%)
Intermediate	No understanding	0.0	1 (4.8%)
	Intermediate basic understanding	48 (58.5%)	10 (47.6%)
	Intermediate understanding	34 (41.5%)	10 (47.6%)
	Intermediate Comprehensive	0.0	0.0
Comprehensive	No understanding	0.0	1 (4.8%)
	Full basic understanding	61 (74.4%)	11 (52.4%)
	Full intermediate understanding	21 (25.6%)	8 (38.1%)
	Full comprehensive understanding	0.0	1 (4.8%)

Table 14: Pearson's correlation between students' and teachers' understanding of menstrual cycle

Correlations			
		Teachers comprehensive understanding	Student comprehensive understanding
Teachers comprehensive understanding	Pearson Correlation	1	.196
	Sig. (2-tailed)		.395
	N	82	21
Student comprehensive understanding	Pearson Correlation	.196	1
	Sig. (2-tailed)	.395	
	N	21	21

Figure 8: Correlation between students' and teachers' understanding of menstrual cycle.



4.8 Testing of hypotheses

The study had four hypotheses which were tested and the following was observed:

i. The first hypothesis was on the relationship between students understanding of menstrual cycle and their sources of information which had a P= 0.019 less than 0.05 meaning it was statistically significant. Therefore the researcher rejected the null (H0) hypothesis and concluded that there was a significant relationship between students' understanding of menstrual cycle and their sources of information regarding menstrual cycle.

ii. The second hypothesis was on the relationship between students understanding of menstrual cycle and the knowledge regarding menstrual cycle which had a P= 0.08 meaning it was not statistically significant. The researcher therefore rejected the alternative (H1) and concluded that there was no significant relationship between students' understanding of menstrual cycle and the knowledge about menstrual cycle.

iii. The third hypothesis was on the relationship between teachers' understanding of menstrual cycle and the knowledge regarding menstrual cycle which had a P= 0.094 meaning it was not statistically significant. The researcher therefore rejected the alternative (H1) and concluded that there was no significant relationship between teachers' understanding of menstrual cycle and the knowledge about menstrual cycle.

iv. The fourth hypothesis was on the relationship between students' and teachers' understanding of menstrual cycle and the knowledge regarding menstrual cycle in which the P= 0.394 greater than 0.05 indicating that it was not statistically significant. Therefore the researcher rejected the alternative (H1) hypothesis and concluded that there was no significant relationship between the students' and the teachers' understanding of menstrual cycle and the knowledge regarding menstrual cycle.

CHAPTER FIVE
SUMMARY OF FINDINGS, DISCUSSIONS, CONCLUSIONS AND RECOMMENDATIONS

5.0 Introduction

In this chapter the researcher presented both the external and internal validity of the study. The researcher also gave the summary of the study based on the study objectives in relation to the literature review done in chapter two. Finally the researcher discussed conclusion, recommendations and areas of further research.

5.1 Validity of the study

The validity of the study was evaluated based on the internal validity in reference to the foreseen limitations in relation to the findings and external validity in reference to the scope of the study.

5.1.1 Internal validity

This study had some important limitations in that while the two schools were selected because of their own initiative to exchange the teenage mothers to encourage them to complete school, there were factors which the researcher anticipated that they would cause some hindrance to data collection. The factors were the research settings being in rural, ethnic community being Luhya, the data collection tool which was a multiple choice questionnaire and transfer of teachers. The study findings indicate that there were 9.6% of the teachers and 1.2% of the students who participated in the research coming from outside the study setting, communities such as Kalenjin and Luo took part in the study in that 1.2% of students and 4.8 of teachers were Luos whereas 4.8% of teachers were Kalenjins. This is a clear indication that the study covered beyond the specified study area and single ethnic group and therefore the two factors were not a hindrance to data collection.

Given the fact that the study was conducted in a rural setting the findings indicated that 23.8% of the teachers and 7.3% of the students resided from the urban areas. It's therefore noticeable that a portion of the participants resided in the urban areas. The data collection tool (multiple choice questionnaires) was developed from the latest secondary school national curriculum which is undertaken by all secondary schools in Kenya. National teacher transfers which post teachers to various schools based on

qualification, subject specialty and vacancy availability did not take place during data collection. It is therefore apparent that there was national representation of the Quantitative estimates due to the availability of participants in and outside the study area and therefore these factors again did not hinder the process of data collection.

5.1.2 External Validity

The main aim of this study was to establish student' and teachers' understanding of menstrual cycle. The independent variable was the knowledge about menstrual cycle while dependent variable was the understanding of the knowledge about menstrual cycle by the students and the teachers. According to the study findings gender distribution was equally distributed with teenage age of 10 -19 years representing all levels of secondary school classes. There was more than one religion participating in the study i.e. Christianity and Islamic. The teachers' age ranged from 26 years to more than 50 years with all categories of marital status taking part. In addition there was representation in the four levels of education that is certificate, diploma, graduate and post graduate taking part in the study whose income ranged from 10,000- 200,000 and cumulatively 61.9% of the respondents indicated having worked between 1-10 years.

As much as gender, age, socio-economic status, religion, level of education and experience influence the generalization of the study they were all considered during data collection and according to the above findings the study can be generalized to other settings nationally them being common factors among the students and teachers in secondary schools nationally.

5.2 Summary of the findings

The summary of the finding was discussed based on the four objectives of the study that is students' sources of information, students' understanding of menstrual cycle, teachers' understanding of menstrual cycle and correlation between students' and teachers' understanding of menstrual cycle.

5.2.1General 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 and 4(23.8%) teachers

had started their period between 14 and 15 years followed by 11 to 13 years 12(14.6%) students and 2(19%) teachers whereas a handful 5(6.1%) students and 1(4.8%) started above 15 years . On assessing whether they had received information prior starting their period 35(42.7) students and 7(41.6) teachers said yes while 7(8.5%) of students and 4(8.4%) teachers said no. But while evaluating if they had adequately been prepared for the first period 19(22.6%) students and 4(19%) said yes while 23(27.4%) students and 7(33.3) teachers said no meaning that most of the young people are not always adequately prepared for menarche.

The findings are consistent with (Koff and Rierdan 2008 and 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.

5.2.2 Students' sources of information

The first objective was 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 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 (Mwita 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 .

5.2.3 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 understanding 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 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, 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 achieved basic comprehensive understanding of menstrual cycle. Refer to table 5 and figure 2 in chapter four data analysis. 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). Whereas Religion and socio-economic status were not significant meaning they do not affect the students' understanding.

5.2.4 Teachers' understanding of menstrual cycle

The teachers' understanding was evaluated by use of the same multiple choice questionnaire as the one for students 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. According to the study findings 18(85.7%) teachers out of 21 (100%) had Basic intermediate understanding followed by 11(52.4%) teaches with full comprehensive basic understanding due to overlap of

terms that were involved in the two level of understanding. 10(47.6%) teachers achieved intermediate basic understanding and intermediate understanding each with only 1(4.8) teacher achieving full comprehensive understanding. Refer to table 10 figure 5 of chapter four.

These findings on teachers lacking full comprehensive understanding concurred with McMahon et al (2011) who conducted a study in rural Kenya and reported that teachers felt it was not their responsibility and was beyond their teaching approval to teach students about menstrual cycle. They had not been trained on menstruation in school as students or as teachers in training and therefore were not well prepared to teach menstrual cycle (McMahon et al 2011). In another comparative study done by Veiga (2007) it was reported that notwithstanding the teachers being required by enactment of the law to impart sexuality and human reproduction knowledge to students, it was not straightforward to achieve, slightly because of deficiencies in the practice of teachers. Also about 85% of the respondents confirmed that they were not confident enough to teach sexuality and human reproduction to teenagers in a classroom setting as they unwaveringly caused experimental errors about physiological and anatomical appearances of the human body (Veiga 2007). Julius (1992) concurred with Veiga (2007) that numerous teachers said that while sex was openly discussed at school, menstruation was often covered in one brief lesson that emphasized the biological aspect, rather than emotional or practical consequences.

Mahon et al (2015) in their study observed that only 22% of men knew the phase of menstrual cycle in which a woman is fertile enough to conceive. While UNESCO (2014) agreed with Mahon et al (2015) emphasized that male teachers were not adequately trained to attend to girls' needs and that male teachers did not allow girls to wash rooms during class time and misunderstood the girls' failure to participate in class during their menses. In a similar study done by Chandra-Mouli and Patel (2017) they recorded that 70–90% of school teachers who had been trained to use various strategies especially play approaches to pass menstruation knowledge to their students found it rather easy and confident to discuss these matters with their students. But he agrees with the findings that teachers who had not been trained in teaching menstrual cycle found it difficult to discuss the same hence they provided limited information concerning menstrual cycle to their students (Chandra-Mouli and Patel 2017).

Chandra-Mouli and Patel (2017) concluded knowledge gap and misconception among young people could be attributed to the adults around them especially their teachers and parents since they also lacked proper information.

While (Mwita 2010) concurred with (Chandra-Mouli and Patel 2017) affirmed that the students received necessary support from their teachers on matters pertaining to menstruation which the teachers based on their past experience and their personal opinions rather than what the official curriculum dictated. In the foregoing study respondents' gender was the only factor among teachers' that influenced their understanding of menstrual cycle ($P< 0.005$).

5.2.5 Correlation between the students' and the teachers' understanding of menstrual cycle.

The students' and the teachers' 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 chapter three data analysis.

According to this study both the teachers 18(85.7%) and the students 70(85.4) had achieved basic intermediate understanding of menstrual cycle with a difference of only 0.3% which is not significant. It was followed by Full comprehensive basic understanding in which 11(52.4%) teachers and 61(74.4%) students demonstrated the understanding with a difference of 22.0% in which the students achieved better understanding than the teacher an observation that can be attributed to inclusion of basic understanding terms in this category of understanding. The third category in both the teachers and the students was Intermediate basic understanding which was achieved by 10(47.6%) teachers and 48(58.5%) students. There was only 1(4.8) teacher and none of the students who achieved full comprehensive understanding of menstrual cycle. The findings again indicated a very slight difference between the students' and teachers' understanding of menstrual cycle.

The study findings were in agreement with Markon (2013) and Thakur et al 2014) in which they all reported that parents, teachers, and schools were uncomfortable and unable to adequately address the needs of their children which he confirmed that it was prohibited for individuals to teach menstrual cycle with explicit sexual messages and therefore teachers were compelled to over-simplify language. They also observed that the science curriculum basic biological aspect of maturation was taught without a focus on reproduction or issues of sexuality such as menstrual cycle and a total of 76.8 percent and 92.3 percent of adult women and young ladies had confirmed that the information provided to these young girls was inadequate. They explained that inadequate information meant the girls had received insufficient information which was not practically beneficial or either the girls were misinformed which depended on where they obtained the information.

The findings were also in agreement with (Mwita 2010) who agreed with Markon (2013) and Thakur et al (2014) that there was scanty information about menstruation among all women of varied ages in Korogocho, Nairobi Kenya. They noted that majority of the surveyed participants in their survey were not able to describe the biological terms associated with menstruation. Moreover majority of the surveyed participants were of the view that, menstrual period signaled the time a women was likely to get pregnant (Mwita 2010). Eördögh (2014), Rajak (2015) and Koff et al (2008) concluded that as much as science had enhanced the general understanding of human biology most men were still unable to gain proper knowledge concerning menstruation and its impact on women. The results showed that most respondents lacked appropriate knowledge concerning menstruation as a biological process.

In conclusion teachers in UNICEF's (2013) study emphasized that there was need for teachers to be trained well in menstrual health management. They recommended that puberty and menstrual health should be integrated in the formal curriculum and to be made examinable to test students' understanding on the subject matter. A Pearson correlation coefficient of r=1 illustrated a monotonic relationship between teachers' comprehensive understanding and Students' comprehensive understanding and P-value of 0.395 (P>0.05) which is statistically insignificant**.** It can therefore conclude that teachers' understanding reduces as students' understanding reduces as the level of

understanding become more technical and with deeper meaning compared to the basic and intermediate level of understanding but the relationship is not necessarily linear.

5.3 Relationship to the general theory

Relationship to the general theory was discussed in relation to constructive theory of understanding and Health Belief Model theory one of the prevention group of theories towards teenage pregnancy prevention.

Constructivist theory by Bruner (1966) states that comprehension is a vigorous progression in that students create fresh thoughts and concepts depending on existing precedential information. Teachers and students take on an active dialog in which the assignment of the teacher is to interpret knowledge to be cultured into a set-up suitable to the learner's existing condition of perceptive. The theory of constructivist also known as instruction concerns itself with tendency towards knowledge, the manner in which knowledge is structured for ease of understanding by the student and simple, new propositions and methods of exploiting information results into high-quality methods for structuring knowledge for ease of understanding. This theory improves the students and the teachers understanding of menstrual cycle if they are given appropriate instructions during learning and training.

According to Becker, Radius and Rosenstock (1978) and Rosenstock (1974) the Health Belief Model theory of prevention in this case teenage pregnancy helps the young people prevent unintended pregnancy. The Health Belief Model has five constructs that is perceived threat and net benefits, supposed vulnerability, supposed cruelty, supposed profits, supposed barriers account for a person’s "willingness to take action and self-efficacy that accounts for individual’s self-assurance in the capability to productively achieve an action in this case prevent teenage pregnancy by understanding menstrual cycle and taking action not to get pregnant by use safe days within the menstrual cycle

A combination of these two theories helps the students and teachers to understand knowledge regarding menstrual cycle and the students to seize control over their bodies and prevent teenage pregnancy and teachers help the students with the right strategies to prevent menstrual cycle.

5.4 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 both for teachers and students who were achieving higher level of understanding. Meaning that poor understanding resulted into poor performance while full comprehensive understanding of the concept of menstrual cycle resulted to good performance in both, which was not achieve because only one teacher out of twenty one demonstrated full comprehensive understanding with their performance ranging between 16 to 39 scores whereas none of the students demonstrated full comprehensive understanding whose performance ranged between 12 to 33 scores all out of 50 scores. In this study the teachers' poor way of structuring knowledge due to the teachers' poor understanding of full comprehensive understanding resulted in students having no full comprehensive understanding of menstrual cycle. The research findings led 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.

5.5 Recommendations

- Education ministry together with the health ministry to carry out country wide awareness campaigns on the knowledge about menstrual cycle and how young people especially female can use that knowledge to prevent teenage pregnancy.
- Different approach is required at school level to address the topic of human biology as the current school curriculum about human biology is not able to produce desired effect on students. It was also observed that the current curriculum cover menstrual cycle in detail as from form three which seems too late because all the female respondents from form one to form four had already experienced menarche way before. Since schools are first sites of gaining scientific and factual knowledge there is a need for a better way of integrating the topic of menstruation at education institutions that is age appropriate.
- The education ministry as a whole need to make informed decision about curricula changes to include more information on menstrual health which will

help students understanding and thus manage their menstrual health better to prevent teenage pregnancy**.** New approaches should ensure that there is awareness among students and teachers to understand menstrual cycle fully to improve adolescent reproductive health knowledge in Kenya thus reducing incidences of teenage pregnancy that is caused partly by misconceptions about menstrual cycle.

- Teaching colleges and universities that train teacher to device more practical and modeling methods to train teachers who are the major sources of information in students' life to improve or change the way they teach reproductive system. Policy makers and the community at large to formulate policies and strategies that will contribute to students' better understanding of menstrual cycle and thus reduction in teenage pregnancy.
- Finally, the scholars and researchers who have special interest in adolescent reproductive health to conduct further research on students' and teachers' understanding of menstrual cycle in relation to improving adolescent reproductive health thus reducing teenage pregnancy.

5.6 Areas of further research

According to the above findings there was a need to carry out research on both the student and teachers curricula with a view of realizing the gaps in the Content of the National curricula so as to improve the teachers' and the students' understanding of menstrual cycle which was beyond the scope of this study. More research is required to include bigger sample size of national, ethnic and to include urban setting and more religions to confirm if the foregoing findings can be treated as a national representation. More research is required to include primary school students especially from class six when female reproductive system is introduced, the primary school teachers and the teenagers who are not in school so as to have all inclusive information on the extent to which students and teachers understand menstrual cycle.

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APPENDICES

Appendix I: Letter for participant consent

Sakwa Jedidah Mukolwe,

University of Nairobi,

Department of Psychology.

Nairobi.

Dear Participant,

I am a Master of Psychology (Community Psychology) student at the University of Nairobi department of Psychology carrying out a research on establishing the students' and the teachers' understanding of menstrual cycle in Navakholo sub-County, Kakamega County. This research is towards the fulfillment of my Master of Psychology Degree. Establishing students' and teachers' understanding will help in reducing any gaps if any in both the teachers' training and the students' methods of teaching and thus will help to improve the students' quality of life through good decision-making skills. Your honest feedback will be appreciated so as to make appropriate recommendations through the research findings.

The study consists of an anonymous questionnaire. The findings will be used in my analysis for my project. There are no risks of participating as well as personal benefits, but it is anticipated that those who participate will contribute to the scholarly research in the field of community psychology, education, and professional development of those involved directly in the process of teaching. Please do not write your name on the questionnaire since all responses are confidential. Your answers are confidential and will not be disclosed to others.

Thank you for your patience, cooperation and time you have taken to participate in this study.

Jedidah Sakwa

Appendix II: Students' and the Teachers' Multiple Choice Questionnaire

Kindly respond to the questions below as honestly as possible. The information given in this questionnaire is purely for academic purposes and will remain confidential.

SECTION A

i. Teacher's Bio Data

Instructions:

Please do not write your name on the questionnaire.

Respond by checking the box against appropriate answer and in case an option is not provided use your own words in the spaces provided.

Gender: Male [ ] Female [ ]

Age in years

- 21– 25 [ ]
- 26 – 30 [ ]
- 30 – 40 [ ]
- 41 – 50 [ ]
- 50 + [ ]

Place of residence: Urban [ ] Rural [ ]

Marital Status:

- Not married [ ]
- Married [ ]
- Divorced [ ]
- Separated [ ]
- Windowed [ ]

Any other (specify) ----------

If Married: 1st…. [ ] … 2nd [ ] 3rd….. [ ] Others [ ] Specify ----------

Education

- Certificate [ ]
- Diploma [ ]
- Graduate [ ]
- Postgraduate [ ]

Number of children: Boys [ ] Girls [ ]

Income per Month in KSH:

- 10,000 – 20,000 [ ]
- 20,000 –30,000 [ ]
- 31,000 – 40,000 [ ]
- 41,000– 50,000 [ ]
- 51,000 – 100,000 [ ]
- 101,000 –150,000 [ ]
- Over 151,000 [ ]

Nationality----------

Ethnic group ----------

Religion:

- Muslim [ ]
- Christian [ ]
- Hindu [ ]
- Traditional [ ]
- Any other [ ] Specify ----------

Experience in years:

- 1 – 5 [ ]
- 6 – 10 [ ]
- 11 – 15 [ ]
- 16 + [ ] Specify ----------

ii. Student's Bio Data

Kindly respond to the questions below as honestly as possible. The information given in this questionnaire is purely for academic purposes and will remain confidential.

Instructions

Please do not write your name on the questionnaire.

Respond by checking the box against appropriate answer and in case an option is not provided use your own words in the spaces provided.

Gender: Male [ ] Female [ ]

Age in years:

- 10 – 12 [ ]
- 13 –15 [ ]
- 16 – 18 [ ]
- 19 + [ ] Specify ----------

Which class are you Forms: **1** [ ] **2** [ ] **3** [ ] **4** [ ]

Parents' Employment:

Mother: Employed [ ] Self Employed [ ] Others: Specify ----------

Father: Employed [ ] Self Employed [ ] Others: Specify ----------

Place of residence: Urban [ ] Rural [ ]

Nationality ----------

Ethnic group ----------

Religion

- Muslim [ ]
- Christian [ ]
- Hindu [ ]
- Traditional [ ]
- Any other [ ]

Specify ----------

SECTION B

Multiple Choice Questions

Part I

Instructions

Please tick the one that corresponds well to your opinion.

1. Have you started your period? (Please tick one). If male please skip to question 5

Yes [ ] No [ ]

2. At what age did you start your period? (If you answered no to question 2 or if male, please skip to question5).....

3. Did you receive any information about the menstrual cycle prior to starting your period?

Yes [ ] No [ ]

4. Did you feel adequately prepared for your first period?)

Yes [ ] No [ ]

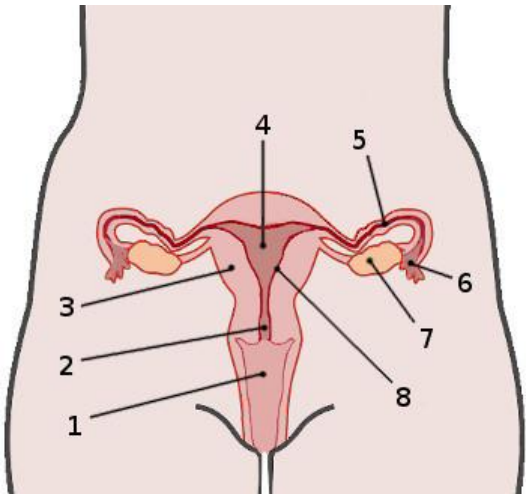
5. From which of the following sources do you receive information about menstrual cycle? Tick (√) as many as are applicable to you:

Announcements over radio	[ ]
Books and magazines	[ ]
School (Teacher)	[ ]
Church (Pastor or Reverend)	[ ]
Handbills and leaflets	[ ]
Banners and posters	[ ]
Family members (e.g., parents, sisters)	[ ]

Friends and peers	[ ]
Movies, cinema and film	[ ]
Health workers (e.g., doctors, nurses etc)	[ ]
Television	[ ]

Part II

This is a multiple-choice question paper which you are required to cycle the **correct answer** to each and every question. Take your time to answer the questions and feel free to ask for any clarification that you may need.



1. The diagram above is a depiction of which system?
   - **A.** Digestive
   - **B.** Female reproduction
   - **C.** Male reproduction
   - **D.** Respiratory system
2. Number 1 on the diagram represents the
   - **A.** Uterus
   - **B.** Vagina
   - **C.** Fallopian tube
   - **D.** Myometrium
3. Part 2 labeled on the diagram represents the
   - **A.** Vagina

B. Endometrium

C. Cervix

D. Uterus

4. Number 3 labeled on the diagram represents the

A. Endometrium

B. Uterus

C. Myometrium

D. Vagina

5. Part 4 labeled on the diagram represents the

A. Vagina

B. Cervix

C. Uterus

D. Fallopian tube

6. Number 5 labeled on the diagram represents the

A. Endometrium

B. Uterus

C. Cervix

D. Fallopian tube

7. Number 6 labeled on the diagram represents the

A. Fallopian tube

B. Ovary

C. Fimbriae

D. Endometrium

8. Number 7 labeled on the diagram represents the

A. Ovary

B. Ovum

C. Testes

D. Fallopian tube

9. Part 8 labeled on the diagram represents the

A. Vagina

B. Cervix

C. Fallopian tube

D. Endometrium

10. Which of the following best describes the menstrual cycle?

A. The menstrual cycle is the monthly changes in the ovaries and in the lining of the uterus, starting with fertilization of an egg

B. The menstrual cycle is the bi-monthly cycle of changes in the ovaries and in the lining of the uterus, starting with the preparation of an egg for fertilization

C. The menstrual cycle is the monthly cycle of changes in the ovaries and in the lining of the uterus, starting with the release of an egg for fertilization

D. The menstrual cycle is the monthly cycle of changes in the ovaries and in the lining of the uterus, starting with the shedding of the endometrium

11. The start of menstruation is called?

A. Menarche

B. Menopause

C. Respiration

D None of the above

12. On average, girls start their menstrual period at what age?

A. 12-13 years

B. 5-7 years

C. 25-30 years

D. Over 50 years

13. How many days is average menstrual cycle?

A. 40

B. 14

C. 21

D. 28

14. Which hormones below are NOT involved in menstrual cycle?

A. Luteinizing

B. Oxytocin

C. Follicle stimulating

D. Progesterone

15. What is shed during the menstrual period?

A. Endometrium

B. Ovarian lining

C. Vaginal tissue

D. Placenta

16. What is the length of the average menstruation phase of the menstrual cycle?

A. Four to seven days

B. One to two days

C. Seven to ten days

D. More than 10 days

17. What is the permanent end of menstruation called?

A. Menses

B. Menarche

C. Menopause

D. Respiration

18. Which of the following is part of menstrual blood?

A. Blood from the uterus

B. Tissue from the uterus

C. All of the above

D. None of the above

19. Which of the following is responsible for regulating the hormones secreted during the menstrual cycle?

A. Pituitary gonadotrophins

B. Nervous system

C. Respiratory system

D. Cardiovascular system

20. Which hormone is highest at the beginning up to day 5 of the menstrual cycle?

A. Follicle stimulating and progesterone

B. Estrogen and follicle stimulating

C. Progesterone and luteinizing

D. Luteinizing and estrogen

21. What hormone is responsible for causing the Graafian follicles to develop in the ovary?

A. Luteinizing

B. Follicle stimulating

C. All of the above

D. None of the above

22. What hormone is responsible for causing the ovum to mature in the ovaries?

A. Estrogen

B. Progesterone

C. Luteinizing hormone

D. Cortisol

23. Proliferative stage usually takes place during which days of the menstrual cycle?

A. 1^{st} to 5^{th} day

B. 5^{th} to 14^{th} day

C. 14^{th} to 20^{th} day

D. 21^{st} to 28^{th} day

24. Secretory phase usually take place duringwhich days of the menstrual cycle?

A. 1^{st} to 5^{th} day

B. 5^{th} to 14^{th} day

C. 5^{th} to 28^{th} day

D. 14^{th} to 28^{th} day

25. Menstruation phase usually takes place during which days of the menstrual cycle?

A. 1^{st} to 5^{th} day

B. 5^{th} to 14^{th} day

C. 14^{th} to 20^{th} day

D. 21th to 28^{th} day

26. During ovulation where is the ovum released into?

A. Endometrium

B. Fallopian tube

C. Vagina

D. Cervix

27. Which of the following is NOT true about ovulation?

A. Ovulation is the time when an egg is released from a mature follicle into the fallopian tube

B. The released egg is viable for 1 day

C. Occurs during approximately day 21 of the menstrual cycle

D. Occurs in response to surge in luteinizing hormone

28. Which of the following is a NOT sign of ovulation?

A. Cervical mucus that is clear, stretchy and looks like egg whites

B. Cervical mucus is yellow/white and sticky

C. Mild abdominal pain

D. Breast soreness

29. Which of the following methods can be used to tell if a woman is ovulating?

A. Counting the days of the menstrual cycle to estimate the ovulation day

B. Monitoring her cervical mucus

C. All of the above

D. None of the above

30. Which of the following may cause a girl not to have her period every month?

A. When a girl first starts her period, she may not have her period every month

B. A girl may be experiencing extreme stress

C. All of the above

D. None of the above

31. Within how many hours is an egg viable after ovulation?

A. 72

B. 48

C. 24

D. 30

32. What is the most fertile time for a woman?

A. On the ovulation day

B. Few days before ovulation

C. All of the above

D. None of the above

33. What is a corpus luteum?

A. The remains of the Graafian follicle after ovulation

B. Immature ovum

C. Fertilized ovum

D. Mature Graafian follicle

34. Which of the following statements is correct if fertilization fails to take place?

A. Corpus luteum disintegrates and estrogen levels increase

B. Corpus luteum disintegrates and progesterone levels fall

C. Corpus luteum disintegrates and progesterone levels increases

D. Graafian follicle bursts open to release mature ovum

35. Which of the following can affect the length woman's menstrual cycle?

A. Illness

B. Stress

C. Medication

D. All of the above

36. Which of the following are common symptoms experienced before menstruation?

A. Back pain

B. Abdominal pain

C. Nausea

D. All of the above

37. Menstrual cramps are caused by?

A. Uterus contracting

B. Increase in hormone like substances (prostaglandins)

C. All of the above

D. None of the above

38. How many phases does the menstrual cycle have?

A. One phase

B. Two phases

C. Three phases

D. Four phases

39. The first stage of menstrual cycle is known as?

A. Luteal phase

B. Ovulation

C. Follicular phase

D. Menstruation

40. The final phase of menstrual cycle is known as?

A. Luteal phase

B. Ovulation

C. Follicular phase

D. Menstruation

41. What is the hormone progesterone responsible for?

A. Stimulates the endometrium to thicken

B. Increases blood supply to the endometrium

C. All of the above

D. None of the above

42. What happens if fertilization occurs?

A. Increase in Progesterone takes place

B. Fertilized egg implants in the uterus

C. All of the above

D. None of the above

43. What is the hormone estrogen responsible for?

A. Repair the endometrium

B. Stimulate the anterior pituitary gland to produce follicle stimulating hormone

C. All of the above

D. None of the above

44. A missed period may be caused by

A. Stress

B. Pregnancy

C. Illness

D. All of the above

45. Which of the following statements is true?

A. A girl cannot get pregnant if the boy withdraws before he ejaculates

B. A teenager cannot conceive on her first sexual date

C. A teenager cannot conceive during her period

D. There is always a chance of getting pregnant if a girl has unprotected sex

46. Which of the following is true?

A. A girl cannot get pregnant if she washes her vagina immediately after sex

B. A girl cannot get pregnant if the boy pulls out before he ejaculates

C. All of the above

D. None of the above

47. Which of the following is true?

A. Sperm dies once it hits the air

B. A girl cannot get pregnant if the boy only inserts the tip of the penis into the vagina

C. A teenager cannot conceive if she has sex while standing

D. A teenager can conceive any time semen comes into contact with her vagina

48. What colour can menstrual blood be

A. Bright red

B. Brown

C. All of the above

D. None of the above

49. What is the average amount of blood lost during a menstrual period?

A. 10-80ml

B.200ml

C. Less than10 ml

D. 300 ml

50. How many eggs are usually released during ovulation?

A. One

B. Two

C. Three

D. Four

Appendix III: Interview Guide or Schedule for female students and teachers

1. In simple terms please define menstrual cycle?
2. How did you feel during your first period?
3. Where do you get your information about the menstrual cycle from?
4. Do you have enough information about the menstrual cycle?
5. What more would you like to learn about the menstrual cycle?
6. What is the connection between periods and pregnancy?
7. What is the most fertile period for a woman?
8. What kind of challenges do you face during your menstrual period? If you have not started your period, or if you are a boy, what kind of challenges do you think those with menstrual periods face?
9. Who do you confide in when you have issues to do with your menstrual period?
10. What kind of information have you been given about periods by your:

- Mothers, Aunts and sisters
- Teachers
- Health workers
- Pastors/imams or other religious leaders

11. Do you think the teachers are supportive towards girls during their menstrual period? (Probe-if yes, why, if no, why?)
12. How do you think boys can be more supportive towards girls during periods?
13. What else can be done to support girls during periods?
14. How do you think society views menstruating girls/women? (probe further)
15. In your opinion, what does religion has to say about menstruating girls/women (probe further)

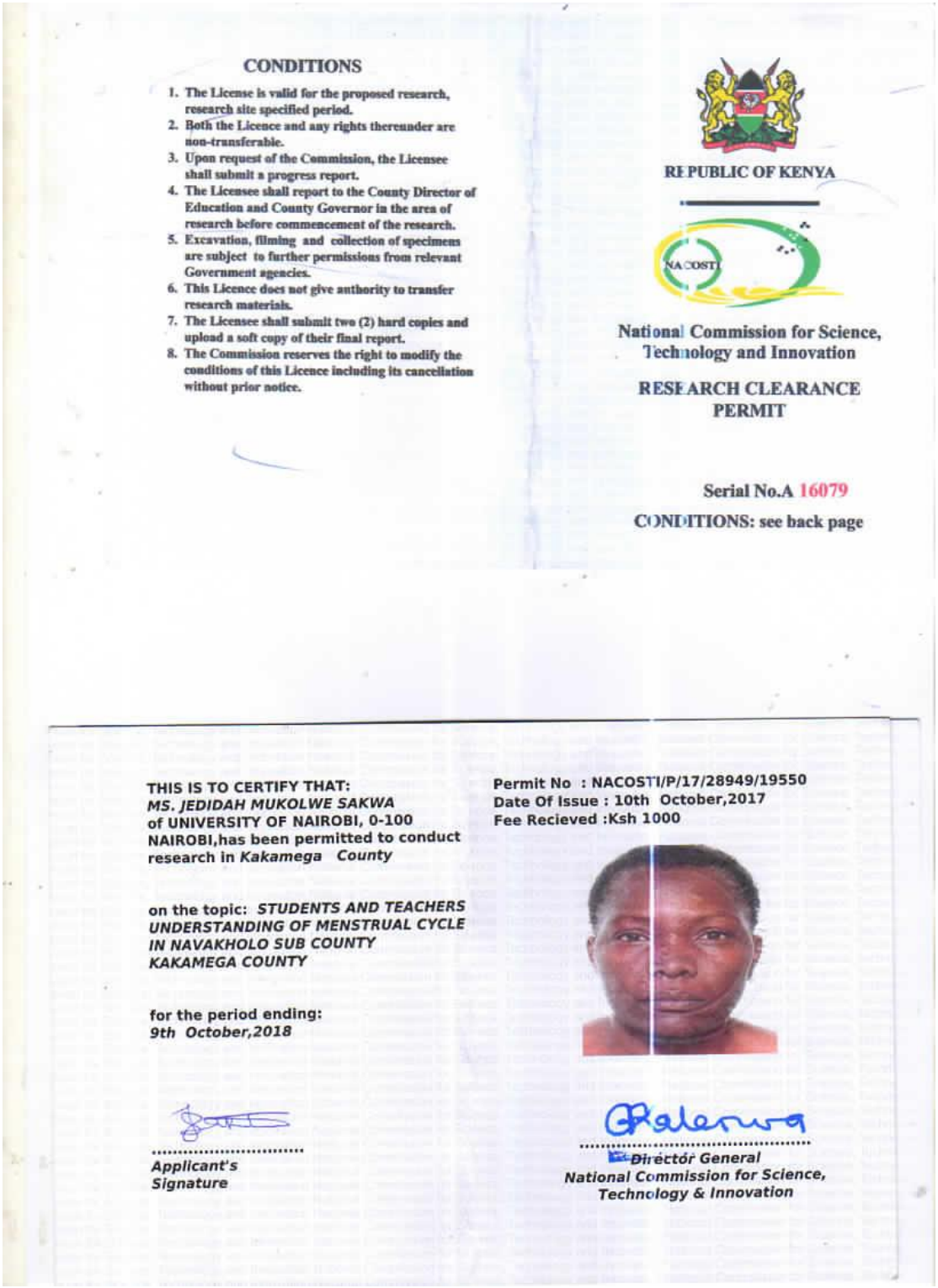
Appendix IV: Interview Guide or Schedule for male students and teachers

1. In simple terms please define menstrual cycle?
2. Where do you get your information about the menstrual cycle from?
3. Do you feel you have enough information about the menstrual cycle?
4. What more would you like to learn about the menstrual cycle?
5. What is the connection between periods and pregnancy?
6. What is the most fertile period for a woman?
7. What kind of challenges do you think girls face during their menstrual period?
8. What kind of information have you been given about periods by your :
    - Mothers
    - Teachers
    - Health workers
    - Pastors/imams or other religious leaders
9. Do you think the teachers are supportive towards girls when they are on their menstrual period? (Probe-if yes, why, if not, why?
10. How do you think boys can be more supportive towards girls while on their periods?
11. What else can be done to support girls while on their periods?
12. How do you think society views girls/women on their menstrual periods? (probe further)
13. In your opinion, what does religion have to say about girls/women on their periods?(probe further)

Appendix V. KIIs with head teacher and deputy head teacher

1. In simple terms, please describe the menstrual cycle
2. What percentage (approximately) of the female student population has started their menstrual period?
3. How does the school deliver information about the menstrual cycle to its students? (Probe-biology class, any other information sessions outside the classroom?)
4. In your opinion, do the students have a good understanding of the menstrual cycle?(probe; are they able to connect what they learn in class with what is happening in their bodies? What is the evidence of this?)
5. In the past five years, have any students become pregnant? If yes, how many?
6. In your opinion, do the teachers have enough information about the menstrual cycle? (Probe-are they able to deliver this information well?)
7. In your opinion, what kind of challenges do teachers face while imparting information about the menstrual cycle to the students? (probe-how have these challenges been addressed?)
8. What measures does the school have in place to support girls during their periods?
9. In your opinion, what challenges do girls face during menstrual period? How have you addressed these challenges?
10. In your opinion, what is society's view of menstruation?
11. In your opinion, what is religion's view of menstruation?
12. In your opinion, what can be done to strengthen the positive views and lessen the negative views? What is currently being done in your school to this effect?

Appendix VI: Research permit



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THIS IS TO CERTIFY THAT:
MS. JEDIDAH MUKOLWE SAKWA
of UNIVERSITY OF NAIROBI, 0-100
NAIROBI,has been permitted to conduct
research in *Kakamega County*

on the topic: *STUDENTS AND TEACHERS UNDERSTANDING OF MENSTRUAL CYCLE IN NAVAKHOLO SUB COUNTY KAKAMEGA COUNTY*

for the period ending:
9th October,2018

.....
Applicant's Signature

Permit No : NACOSTI/P/17/28949/19550
Date Of Issue : 10th October,2017
Fee Recieved :Ksh 1000

.....
Director General
National Commission for Science, Technology & Innovation

Appendix VII: Map of part of Navakholo sub County