

**KNOWLEDGE, SOURCES OF INFORMATION AND EXPERIENCES
OF PUBERTY AMONG FEMALE ADOLESCENTS IN JUNIOR
SECONDARY SCHOOLS IN IBADAN SOUTH-WEST LOCAL
GOVERNMENT, NIGERIA**

BY

**UCHECHI EKEZIE
MATRIC NO.: 161376**

B.Sc. APPLIED BIOLOGY AND BIOTECHNOLOGY (ENUGU)

**A DISSERTATION SUBMITTED TO THE DEPARTMENT OF
HEALTH PROMOTION AND EDUCATION, FACULTY OF PUBLIC
HEALTH, COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN
IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR
THE DEGREE OF MASTER OF PUBLIC HEALTH
(HEALTH PROMOTION AND EDUCATION)
OF THE
UNIVERSITY OF IBADAN**

JULY, 2014

DEDICATION

This work is dedicated to my faithful God, Jehovah Elhaneman. Your help has brought me this far. I am forever grateful to you and to my friend and instructor, the Holy Spirit. Walking with You is one of the best things I have ever done.

UNIVERSITY OF IBADAN

ACKNOWLEDGEMENTS

I greatly appreciate the guidance and mentorship of my amiable supervisor, Dr. Oyedunni S. Arulogun who out of her very busy schedule made out time to thoroughly supervise this research work. Ma, you are the best, God bless and keep you Ma.

Immense thanks to the Dean of the Faculty of Public Health, Professor A. J. Ajuwon, the head of department of Health Promotion and Education, Professor O. Oladepo, Drs. F. O. Oshiname, O. E. Oyewole and Mr. M.A. Titiloye who played an active role in making my MPH career a success and also Mr. T. Oyeyemi for his assistance.

I am indebted to my parents, Mr. and Mrs. Malachy Ekezie for their moral, financial, spiritual and psychological support during the course of this work. Dad, though you had a serious health challenge that led to the amputation of your left leg, you were strong psychologically and always encouraged me and to mum who masterminded that your health status should not be disclosed to me in order to allow me concentrate on my work. Both of you were always there for me and provided all I needed even during the months that you were in the hospital. I am forever grateful to you. May God guide and keep you to live and eat the fruit of your labour. I am also grateful to my siblings who were always there to encourage me and also stood in the gap for me and stayed around my parents during their stormy period, I love you all. You are the best. I would not have prayed for a better family.

I am also grateful to the principals of the schools I used for my research for giving me the permission to carry out this research in their schools and the teachers for their assistance while administering the questionnaire to the students and also to the students for their time.

I greatly appreciate Bishop and Pastor (Mrs) T. V. Adalakun for their moral and spiritual support which gave me the strength to carry on. I am forever grateful to Dr and Mrs. Sowunmi for providing me a free accommodation during the period of my MPH and for their moral and financial support and also to Grandma Iwo road (Mrs Dada) for her love and care.

My sincere gratitude also goes to me friends, Evang. Kelechi Eze (MOG) and Uchenna Ezeakunne, my sister from another mother for their moral, psychological and spiritual support, and her family for their love and care. Thanks to my colleagues in Health Promotion and Education and other departments in the faculty of Public health for their cooperation and constant support. You shall get to the peak of your career. I miss you all.

ABSTRACT

Puberty is a major biological change in adolescence that is characterised by physical, social and emotional development. In Nigeria, most female adolescents are not well informed about puberty before they experience it and more information is required on young adolescents' knowledge and experience of puberty. This study was designed to investigate the knowledge, information sources and experiences of puberty among junior secondary school female adolescents in Ibadan South-West Local Government Area (LGA), Oyo State, Nigeria.

This cross-sectional survey used a five-stage sampling technique in selecting the LGA, wards, schools, arms of classes and 420 female adolescents between the ages of 10-14 years in junior secondary classes. Data were collected using a pre-tested Focus Group Discussion (FGD) guide and a semi-structured questionnaire. The questionnaire included a 16-point knowledge scale and questions on sources of information of puberty, experiences of puberty and menstruation. Knowledge scores of 0-7, $7 < 12$ and ≥ 12 were rated as poor, fair and good respectively. The six FGDs conducted were analysed using thematic approach and quantitative data were analysed using descriptive statistics, Chi-square test and logistic regression at 5% level of significance.

Mean age was 13.0 ± 0.9 years. About 23% had good knowledge of puberty and it increased with respondents' class: J.S.S.1 (3.1%), J.S.S.2 (25.8%) and J.S.S.3 (71.1%). Those in J.S.S.2 (OR 0.1, 95% C.I:0.1-0.3) and J.S.S.1 (OR 0.3, 95% C.I:0.2-0.5) were less likely to have good knowledge of puberty compared with those in J.S.S.3. Majority (82.1%) had heard about puberty from school teachers (65.5%) being the major source of information. The preferred source of information of puberty was mothers (42.4%) and other sources were school teachers (40.5%), doctors (6.4%), sisters (5.0%), books/magazines (3.3%), films/videos (1.2%), friends (0.7%) and Internet (0.5%). All the respondents had experienced at least one of the changes that occur in puberty. Ninety nine percent had developed breasts out of which, 84.0% claimed they experienced pain when their breasts were developing. Sixty-seven percent had started menstruating with the age range at menarche being 8-14 years. Of this, 84.5% experienced menstrual problems. Headache and abdominal pain (47.9%) were the most reported menstrual problems experienced. About (61.5%) who experienced menstrual problems did not seek medical help and this was confirmed by FGD participants who attributed it to financial constraints

and some felt that menstrual problems were normal. Methods employed by participants to address menstrual problems included: taking hot water or tea, herbs, salt and water, *garri* and salt and having some rest. Items and activities avoided during menstruation included sugary foods, physical exercise, going to school and engaging in sexual relationship.

Young adolescents, especially those in junior secondary class one and junior secondary class two in Ibadan South-West Local Government Area did not have good knowledge of puberty with mothers being the most preferred source of education. Therefore, mothers, teachers and peer educators should be trained by the school and health authorities to better educate the girl child on puberty.

Keywords: Knowledge of puberty, Reproductive health, Female adolescents

Word count: 484

UNIVERSITY OF IBADAN

CERTIFICATION

I hereby certify that this research work was carried out by **Uchechi EKEZIE** in the Department of Health Promotion and Education, College of Medicine, University of Ibadan.

SUPERVISOR

Dr. O. S. ARULOGUN

B.Ed, M.Ed, MPH, Ph.D (Ibadan), Dip. HIV Mgt. and Care (Israel), FRSPH (UK), CCST (Nig)

Reader

Department of Health Promotion and Education,

Faculty of Public Health, College of Medicine,

University of Ibadan,

Ibadan, Nigeria.

TABLE OF CONTENTS

Title page	i
Dedication	ii
Acknowledgement	iii
Abstract	iv
Certification	vi
Table of contents	vii
List of tables	x
List of figures	xi
List of acronyms used in the text	xii

CHAPTER ONE: INTRODUCTION

1.1	Background to the study	1
1.2	Statement of the problem	3
1.3	Justification	5
1.4	Research questions	5
1.5	Objectives of the study	6
1.6	Hypotheses	6
1.7	Scope of the study	7
1.8	Limitation of the study	7
1.9	Operational definition of terms	7

CHAPTER TWO: LITERATURE REVIEW

2.1	Review of concepts	8
2.1.1	Adolescence	8
2.1.2	Precocious Puberty	11
2.1.3	Effects of early puberty	12
2.1.4	Delayed puberty	14
2.1.5	Knowledge of puberty among adolescents	15
2.1.6	Sources of information of puberty	16
2.1.7	Misconceptions about puberty	17
2.1.8	Menstruation	20
2.1.9	Premenstrual Syndrome (PMS)	23

2.1.10	Kinds of problems women have with their periods	25
2.1.11	Menstrual hygiene	28
2.1.12	Menstrual hygiene management	32
2.2	Empirical Review	35
2.2.1	Experience of menstruation	35
2.2.2	Health-seeking behaviour	38
2.3	Theoretical framework	39
2.3.1	Precede model	39

CHAPTER THREE: METHODOLOGY

3.1	Study design	42
3.2	Study area	42
3.3	Study sites	43
3.4	Study population	43
3.5	Inclusion criteria	43
3.6	Exclusion criteria	43
3.7	Sample size determination	43
3.8	Sample selection	44
3.9	Pre-test of the research instruments	48
3.10	Data collection	48
3.10.1	Focus Group Discussion	48
3.10.2	Questionnaire	48
3.11	Validity and reliability of instrument	49
3.12	Data collection process	49
3.13	Data management and analysis	50
3.14	Ethical consideration	50

CHAPTER FOUR: ANALYSIS AND PRESENTATION OF RESULTS

4.1	Respondents' socio-demographic characteristics.	52
4.2	Knowledge of puberty	54
4.3	Sources of Information of puberty	63
4.4	Experiences of puberty.	66
4.5	Experience of menstruation	68
4.6	Hypotheses testing	73

CHAPTER FIVE: DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1	Discussion	80
5.2	Conclusion	85
5.3	Recommendations	85
	References	88
	Appendices	96

UNIVERSITY OF IBADAN

LIST OF TABLES

Tables	Pages
3.1 Names of schools selected from each ward and the total number of female students in each school.	46
3.2 Proportionate sampling method used in selecting the number of students from each school.	47
4.1 Respondents' socio-demographic characteristics.	53
4.2 Knowledge of puberty among respondents.	55
4.3 Percentage of respondents' knowledge grade.	57
4.4 Relationship between respondents' age, class, father's highest educational level, mother's educational level and knowledge of puberty.	58
4.5 Relationship between respondents' religion, ethnic group, father's occupation, mother's occupation and knowledge of puberty.	59
4.6 Logistic regression analysis of the relationship between age, father's highest educational level and mother's educational level and knowledge of puberty.	61
4.7 Logistic regression analysis of the relationship between class and the knowledge of puberty.	62
4.8 Respondents' awareness and sources of information of puberty and menstruation.	64
4.9 Respondents' preferred sources of information of puberty.	65
4.10 Changes experienced by the respondents during puberty.	67
4.11 Respondents' experience of menstruation problem and activities avoided during menstruation.	72

LIST OF FIGURES

Figures	Pages
2.1 Precede model applied to knowledge, information sources and experiences of puberty	41
4.1 Respondents' age at menarche.	71

UNIVERSITY OF IBADAN

LIST OF ACRONYMS USED IN THE TEXT

CDC	-	Centre for Disease Control
FMOH	-	Federal Ministry of Health
FSH	-	Follicle stimulating hormone
GnRH	-	Gonadotropin-releasing hormone
HCG	-	Human chorionic gonadotropin
PATH	-	Programme for Appropriate Technology in Health
PAVHNA	-	Pakistan Voluntary Health and Nutrition Association
PMS	-	Premenstrual syndrome
WHO	-	World Health Organization

UNIVERSITY OF IBADAN

UNIVERSITY OF IBADAN

CHAPTER ONE

INTRODUCTION

1.1 Background to the study

Adolescents are young people between the ages of 10 and 19 (WHO, 2011). Adolescence is a transitional period between childhood and adulthood. It is the stage of life when individuals reach sexual maturity and experience a change in their physical, social, and emotional aspects of life. In order to effectively deal with this transition, they require information and a clear picture of their bodily changes to prevent them from physical problems, guilt, ambiguity, and confusion (Khan, 2000).

Young people need to learn how to manage new feelings about sexuality in order to make responsible decisions about their health, reproduction, and parenthood. When an adolescent's body begins to change before or after that of all their peers, the result could be a negative body image, feelings of social isolation and overall confusion (Benhague, Christenson, Martin and Wysong, 2006).

The onset of menstruation is one of the most important physiological changes occurring among girls during the adolescent years. Menstruation heralds the onset of physiological maturity in girls. It becomes the part and parcel of their lives until menopause (Garg, Goyal and Gupta, 2011). A study among adolescent girls in Northern Tanzania have shown that adolescents do not have adequate knowledge of puberty and the sources which they depend on to get information give them wrong information (Sommer, 2009). A girl's first experience of menstruation is marked by feelings of anxiety and eagerness to know about this phenomenon. However, they do not get the appropriate knowledge due to lack of a proper health education programme in schools (Tazeen, Ali, Azam and Humaira, 2004). This leads to repression of feelings which can cause mental stress and also seek health advice from quacks and persons who do not have adequate knowledge on the subject. Moreover, the routine health services do not have provisions for adequate care of adolescent health problems (Singh, Devi and Gupta, 1999). In a study conducted among female adolescents to explore the

understanding of puberty and related health problems in Karachi, Pakistan, the participants reported their first menstrual experience as shocking (44%), fearful (30%) and stressful (18%), because they were never given any information about menstruation before it occurred (Tazeen *et al*, 2004).

The experience of menarche could be positive or negative. The positive experiences includes being proud of physical maturity and to perceive it as a warm experience while the negative experiences include being ashamed, tearful, scared of menarche as a kind of punishment for guilt or confuses it with other symptoms of diseases. These experiences of menarche can be influenced by various factors such as previous information about menstruation from significant others (e.g mothers, sisters, friends) school education and mass media, the time of menarche, environmental factors etc (Kim, 1995).

Studies have revealed that majority of female adolescents have very limited information about puberty. A qualitative research based study in Karachi found various misconceptions about menstruation. Majority of the girls perceived menstruation as the ability to give birth and bathing as harmful during menstruation and felt it inappropriate to talk about their bodies (Mohammed, 2004). Despite the sociocultural and technological advances made in the twentieth century, information concerning biopsychosocial and sexual growth and development, which is necessary for the development of a psychosocial identity have not reached most adolescents in a wide and appropriate way. This results in high levels of misinformation about these aspects (Gomes, Costa, Sobrinho, Santos and Bacelar, 2002).

In general, adolescents do not receive information on health from their families and when they have access to it, the information is usually limited and inadequate, and is given by friends or poorly prepared individuals. The most widely disseminated pieces of information are concerned with the use of condoms as a form to prevent STD/AIDS, however, the way the body works in respect to puberty, sexual maturation, experiences and conflicts that arise from growth and sexuality are seldom discussed (Gomes *et al*, 2002).

The result of a study among parents and teachers showed that 65.2% of parents and 40.9% teachers have not discussed growth and development issues with their adolescents. Only 5.2%

teachers and 1.1% parents discussed sexual aspects with adolescents (Nair, Leena, Paul, Pillai, Babu, Russell and Thankachi, 2011).

Factors that lead to risky sexual and reproductive health behaviour among adolescents are the lack of sexual and reproductive health information and skills in negotiating sexual relationships, inaccessibility of youth-friendly sexual and reproductive health services and peer pressure. Therefore, reproductive health of the young people is a growing concern today and is considered a corner stone of health and a major determinant of human social development (Tazeen, *et al*, 2004). Various stakeholders (particularly religious leaders) have argued that teaching adolescents about sex and reproductive health would encourage them to indulge in sexual activities. And yet, despite the sensitivity of the issue, there is increasing consensus and acknowledgement that it is important to institute effective sex education programmes to equip young people with information as well as skills to help them make informed and responsible decisions on sexual and reproductive health matters (Bankole, Biddlecom, Guiella, Singh and Zulu, 2007). The key challenge is to determine what specific information to give very young adolescents, from what sources, at what ages and in what ways. One of the first steps in addressing these questions is to understand the current sexual and reproductive health behaviours and needs of very young adolescents (Bankole, Ahmed, Neema, Ouedraogo and Sidon, 2007).

1.2 Statement of the problem

The changes that take place in adolescents during puberty are associated with physical, psychological and emotional challenges. More young girls are showing signs of puberty as early as 7 or 8 years (Goodwin, 2010) and children with early sexual development are more likely to have psychological and social problems (Styne and Grumbach, 2008).

Studies have shown that adolescents in pubertal stage are becoming sexually active (Bankole *et al*, 2007). Maturing young girls experience emerging sexual feelings which can make them engage in risky sexual behaviours, drug or alcohol use and have self-esteem problems (Zuckerman, 2001).

However, these adolescents have little knowledge about the way their body develops with respect to puberty, sexual maturation, experiences and conflicts that arise from growth and

maturity (Gomes *et al*, 2002). A study carried out among female adolescents in Pakistan showed that they have limited access to puberty related health education and services (Khan, 2000) and that they lack confidence and had inadequate information about their body changes (Mohammed, 2004). In a study carried out among 10-14 year old females in Iran, more than 50% of the girls do not have adequate knowledge on the physical and psychological problems during puberty and had no clue of how to face the problem during this period and how to keep healthy (Afsaneh, Shokouh, Rezvan and Gbolam, 2007).

Most female adolescents are not informed about puberty before they experience it (Tazeen *et al*, 2004) and there is a poor level of knowledge of menstruation among them (Mohammed, 2004). Adolescents also have various myths and misconceptions on menstruation, breast size, feelings and relationships (Omigbodun and Omigbodun, 2004).

In a study conducted among secondary school girls in Southeastern Nigeria to determine their perceptions, problems and practices on menstruation, only 39.3% of them perceived menstruation to be physiological (Echendu and Adinma, 2008) and also in a study conducted among female adolescents in Karachi, Pakistan, to explore the understanding of puberty and related health problems, the participants reported their first menstrual experience as shocking (44%), fearful (30%) and stressful (18%) because they were not given any information about menstruation before it occurred (Tazeen *et al*, 2004).

Many researches have been done on various aspects of adolescent reproductive health but not much has been done on their knowledge and experiences of puberty and there is limited data on the sources from which adolescents obtain their information of puberty (Liyang, Xiaoming and Igbal, 2007). Most times, the information they get are limited and the sources are questionable and this results in wrong information and misconceptions about puberty. The primary sources of information are the media and their peers and the information obtained are predominantly negative (Onyeonoro, Oshi, Ndimele, Chuku, Onyemuchara, Ezekwere, Oshi and Emelumadu, 2011).

This study intends to provide information on the level of knowledge of puberty, sources from which young adolescents get information of puberty and the experiences as well as the health-seeking behaviour among female adolescents between the ages of 10-14 years in Ibadan South-West LGA, Oyo State, Nigeria.

1.3 Justification

The research takes into consideration the very young adolescents (10-14) which most studies have not done.

A review of relevant literature on knowledge, sources of information and experiences of puberty among young female adolescents in Nigeria showed a few study and they were related to menstruation and other reproductive health issues among older adolescents and young adults- those age 15-24 years. The evidence on very young adolescents is limited. This limited number of literatures suggests a paucity of data about puberty among young female adolescents in Nigeria.

This study provides information on the level of knowledge of puberty among young female adolescents, the sources they get information about puberty and the quality of information they receive. It also provides information on the experiences of puberty and menstruation and the health-seeking behaviour of the adolescents who experience menstrual problems.

The information obtained from this study would provide rational basis for modifying existing reproductive health education curriculum for young adolescents. It will also provide evidence for the need to provide enabling environment for young adolescents to discuss their reproductive health concerns and also make provision for facilities in schools that will enable them maintain menstrual hygiene and also receive appropriate attention and solutions for menstrual problems and other health problems adolescents may face.

1.4 Research Questions

1. What is the level of knowledge of puberty among the respondents?
2. What are the sources of information of puberty among the respondents?
3. What are the experiences and health-seeking behaviour of puberty among the respondents?

1.5 Objectives of the study

Broad objective

The broad objective of this study was to investigate the knowledge, information sources, experiences and health-seeking behaviour of puberty among female adolescents in junior secondary schools in Ibadan South-West LGA.

Specific objectives

The specific objectives were to:

1. Assess the knowledge of puberty among the respondents.
2. Identify the various sources of information of puberty among the respondents.
3. Describe the experiences and health-seeking behaviour of puberty among the respondents.

1.6 Hypotheses

1. There is no association between the age of the respondents and their knowledge of puberty.
2. There is no association between the age of the respondents and their preferred sources of information of puberty.
3. There is no association between the age of the respondents and their experience of menstrual problem.
4. There is no association between the age of the respondents and their health-seeking behaviour.
5. There is no association between the educational level of parents and the health-seeking behaviour of the respondents.
6. There is no relationship between the respondents' level of knowledge of puberty and their experience of menarche.

1.7 Scope of the study

This study is limited in scope to female adolescents between the ages of 10-14 years in junior secondary school 1 to junior secondary school 3 (J.S.S.1-J.S.S.3) in mixed and single sex public schools in Ibadan South-West Local Government Area.

1.8 Limitation of the study

The findings of the study may not be generalizable because of the small population that was covered.

1.9 Operational definition of terms

Adolescents - These are young females between the ages of 10-14 years in junior secondary schools in Ibadan South-west LGA.

Puberty - It is the physical, biological and emotional changes that occurred in the females between 10-14 years in junior secondary schools in Ibadan South-west LGA.

Menarche - This is the first flow of menstrual blood in the females between 10-14 years in junior secondary schools in Ibadan South-west LGA.

Junior School I and II - These are the different arms of schools from which females between 10-14 years in junior secondary schools in Ibadan South-west LGA were selected. For administrative purposes, the junior secondary schools in Ibadan South-west LGA have been grouped into junior school I and junior School II.

CHAPTER TWO

LITERATURE REVIEW

2.1 Review of concepts

2.1.1 Adolescence

Adolescence is a time of transition from childhood to adulthood (Erin, 2007). It represents a period of significant growth. Part of the transition that takes place during this period is the occurrence of puberty. Puberty is an important period of life when children begin to mature biologically, psychologically, socially and cognitively (Afsaneh *et al*, 2007). It is the time of physical change that transforms a child's body into an adult's body. It occurs during adolescence between ages 10 and 14 for girls and ages 12 and 16 for boys. The biological changes of adolescence include hormonal changes leading to growth of secondary sex characteristics (Susman and Rogol, 2004).

Puberty starts when a part of the brain called the hypothalamus releases a hormone called gonadotropin releasing hormone (GnRH). GnRH then signals the pituitary gland to release two more hormones - luteinizing hormone (LH) and follicle-stimulating hormone (FSH) to start sexual development (Shriver, 2007). Among different levels and periods of growth, adolescence is very important and outstanding because the changes that happen to an adolescent affect both family and society as well (Havez, 2001). The following development takes place during the period of adolescence:

Physical development

Adolescents experience changes in their physical development. The physical development includes:

For girls

Breast development, hair growth in the armpit and in the pubic area, hips get enlarged and curvy, menstruation occurs, increase in height and increase in weight (Erin, 2007).

For boys

Breaking of voice, enlarged shoulders, enlarged testes and penis, spermache, wet dreams and increase in height (Erin, 2007).

Recent research suggests that teenagers' brains are not completely developed until late in adolescence. Specifically, studies suggest that the connections between neurons affecting emotional, physical and mental abilities are incomplete. This could explain why some teenagers seem to be inconsistent in controlling their emotions, impulses, and judgments (Strauch, 2003).

Social and emotional development

Puberty is associated with the problem of sexual identity and a person's perception of self. During adolescence many boys and girls become preoccupied with their looks and are often dissatisfied with how they look. Boys and girls worry about pimples, their shapes etc. Boys want to be taller and develop big muscles and girls want good shapes and beautiful faces. They may feel embarrassed about their developing bodies and feel a strong desire for privacy. They are concerned about how the opposite sex perceives them. They do not want to be different from their peers. Adolescents with poor self esteem may do socially unacceptable things if it makes them belong to a particular group (Zuckerman, 2001).

Puberty also triggers off an interest in the opposite sex and a desire to get to know them better. This coupled with the high energy level during adolescence makes it imperative that young people channel this energy and interest constructively. In order to decrease premature sexual affairs, adolescents need to be involved in interesting activities that result in legitimate relationship with the opposite sex. Youth clubs, sports and hobbies are examples of good ways of harnessing sexual energy positively (FMOH, 2005).

Cognitive Development

Adolescents develop better thinking skills. These cognitive development can be divided into the following:

- **Developing advanced reasoning skills:** Advanced reasoning skills include the ability to think about multiple options and possibilities. It includes a more logical thought process and the ability to think about things hypothetically. It involves asking and answering the question, "what if...?"
- **Developing abstract thinking skills:** Abstract thinking means thinking about things that cannot be seen, heard, or touched. Examples include things like faith, trust, beliefs and spirituality.
- **Developing the ability to think about thinking in a process known as meta-cognition:** Meta-cognition allows individuals to think about how they feel and what they are thinking. It involves being able to think about how one is perceived by others. It can also be used to develop strategies, also known as mnemonic devices, for improving learning. Remembering the notes on the lines of a music staff (e, g, b, d, and f) through the phrase "every good boy does fine" is an example of such a mnemonic device (Erin, 2007).

Psycho-social development

There are five recognized psychosocial issues that young people deal with during their adolescent years. These include:

- **Establishing an identity.** This has been called one of the most important tasks of adolescents. The question of "who am I?" is not one that teens think about at a conscious level. Instead, over the course of the adolescent years, teens begin to integrate the opinions of influential others (e.g. parents, other caring adults, friends, etc.) into their own likes and dislikes. The eventual outcome is people who have a clear sense of their values and beliefs, occupational goals, and relationship expectations. People with secure identities know where they fit (or where they don't want to fit) in their world.
- **Establishing autonomy:** this means becoming an independent and self-governing person within relationships. Autonomous adolescents have gained the ability to make and follow through with their own decisions, live by their own set of principles of right and wrong and have become less emotionally dependent on parents.
- **Establishing intimacy:** Intimacy is usually first learned within the context of same-sex friendships, then utilized in romantic relationships. Intimacy refers to close relationships in which people are open, honest, caring and trusting. Friendships provide the first setting in

which young people can practice their social skills with those who are their equals. It is with friends that teens learn how to begin, maintain, and terminate relationships, practice social skills and become intimate (Erin, 2007).

- **Becoming comfortable with one's sexuality:** The teen years mark the first time that young people are both physically mature enough to reproduce and cognitively advanced enough to think about it. Given this, the teen years are the prime time for the development of sexuality. (Erin, 2007). How teens are educated about and exposed to sexuality will largely determine whether or not they develop a healthy sexual identity. Over one-third of high school students report being sexually active and almost half (46%) reported that they have had sex (Anon, 2007).
- **Achievement:** Our society tends to foster and value attitudes of competition and success. Because of cognitive advances, the teen years are a time when young people can begin to see the relationship between their current abilities and plans and their future vocational aspirations. They need to figure out what their achievement preferences are - what they are currently good at and areas in which they are willing to strive for success (Erin, 2007).

Values and moral development

Adolescence is a crucial time for the development of a personal moral system. The increase in intellectual ability and the need to know and challenge extends also to the moral and religious areas of life. Many adolescents are searching for something to believe in that will make sense out of their world and will give meaning to their lives. This may lead to increased religious activity and sometimes some fanaticism (FMOH, 2005).

2.1.2 Precocious puberty

Precocious puberty describes puberty occurring at an unusually early age. In most of the children that experience precocious puberty, the process is normal in every respect except the unusually early age, and simply represents a variation of normal development. Menstruation beginning at younger ages might signal an underlying medical condition, or it might have no specific cause.

In girls, precocious puberty is when any of the following takes place before age 8:

Growth of armpit or pubic hair, breast development, first period (menarche), mature outer genitals, rapid growth, body odour and Acne (Jones, 2010).

Causes of precocious puberty

A study conducted by an Indian origin scientist has found that earlier onset of menarche (first menstrual cycle) is associated with increased body mass index (BMI), waist circumference, and obesity (Fox, 2005).

There are two types of precocious puberty namely: central and peripheral.

1. Central precocious puberty is the more common type. The process is identical to normal puberty, but happens early. The pituitary gland is prompted to produce hormones called gonadotropins. These hormones in turn stimulate the testicles or ovaries to make other hormones, testosterone or estrogen. It is these sex hormones that cause the changes of puberty, like breast development in girls.

2. Peripheral precocious puberty or precocious pseudo-puberty is a different condition. It is also rarer. The hormones estrogen and testosterone trigger the symptoms. But the brain and pituitary gland are not involved. It is usually a local problem with the ovaries, testicles, adrenal gland, or a severely underactive thyroid gland (Nelson, 2009).

2.1.3 Effects of early puberty

Children with early sexual development are more likely to have psychological and social problems. Children and adolescents generally want to be the same as their peers, and early sexual development can make them appear different. This can result in self-esteem problems, depression, acting out at school and home, and abuse of alcohol and illegal substances (Styne and Grumbach, 2008).

Menarche might cause emotional and behaviours difficulties in young girls, says Dr. Zuckerman. Emerging sexual feelings might confuse young girls or they might be teased by their classmates. Girls developing physically at young ages are at increased risk for aggressive behaviour and depression, and they might withdraw socially. At the same time, they are more

likely to engage in risky behaviours, such as sexual activity, drug or alcohol use, than their peers (Zuckerman, 2001).

Early puberty might stunt growth, according to the Nemours Foundation. Early menarche also might increase a girl's risk of developing breast cancer in adult years, notes Zuckerman. There are few well designed studies of the psychological or social impact of early puberty, and most evaluate the experiences of girls who menstruate at an early age, rather than the larger number of girls who are developing breasts and pubic hair at an early age. Although common sense would suggest that a nine or ten year old girl who looks like a teenager might feel self conscious or have trouble making friends with classmates, researchers are only beginning to study these girls (Zuckerman, 2001). Much remains unknown; however, the data suggest potentially serious problems:

Girls who started menarche (menstruation) earlier tend to begin dating and having sexual intercourse younger than their classmates, according to a national study of 1,800 girls between the ages of 15 and 19. Among white and Hispanic girls (but not African American girls), early menarche was associated with earlier marriage.

Girls who matured early experienced more psychological stress, and were more vulnerable to deviant peer pressures and fathers' hostile feelings, in a study of 200 adolescents (Ge and Conger, 1996).

A study of 33 girls from six to 11 years of age who experienced precocious puberty found that they have more behaviour problems than other girls. They were more likely to be depressed, aggressive, socially withdrawn, have sleeping problems and report obsessive behaviour (Sonis, Comite and Blue, 1985).

In a study of 1,700 high school students from Oregon, those who report that they matured earlier than their classmates were more likely to drink and smoke, and twice as likely to have had substance abuse and disruptive behaviour disorders. They also tend to have lower self-esteem, poorer coping skills, miss more days of school, and were more likely to attempt suicide (Graber, Lewinsohn, Seeley and Brooks-Gunn, 1997).

On the other hand, problems like depression and aggression are caused by hormonal changes associated with early development, teenage pregnancy, sexually transmitted diseases, and the

emotional trauma of sexual abuse are also serious concerns. Maturing young girls will have to cope with their own confusing sexual feelings as well as the impact that their appearance have on boys and men. Whether a 10 year old girl becomes sexually active because hormonal changes influence her sexual interest, or because her appearance attracts older boys and men, the result could be the same. Young girls will need help to prevent them from being sexually abused or exploited, and from the risks of “consensual” sexual activity (Zuckerman, 2001).

2.1.4 Delayed puberty

Puberty is said to be delayed or later than normal in a girl when certain changes have not occurred by a certain age such as:

- No breast development by age 14 years
- No pubic hair present by age 14 years
- Not menstruating by age 16 years
- It is more than five years since the first sign of breast development appeared and she has not yet had her first period
- Underweight (BMI less than -2Z score for age).

Causes of delayed puberty

The most common cause of delayed puberty is the normal variation in the age at which girls start puberty. Such variation often runs in the family, for example, the mother of a girl who is late in starting her puberty may have started her puberty late. Also poor nutrition and chronic illnesses can cause delays in puberty (WHO, 2011).

Effects of delayed puberty

A girl with delayed puberty is likely to be shorter than other girls of the same age. However, as she goes through puberty her height is likely to catch up with that of her peers. Almost all girls with delayed puberty eventually develop normally and are able to live normal lives including having children if they wish (WHO, 2011).

2.1.5 Knowledge of puberty among adolescents

Studies have revealed that majority of female adolescents have very limited information about puberty. In a study conducted among female adolescents to explore the understanding of puberty and related health problems in Karachi, Pakistan, the participants reported their first menstrual experience as shocking (44%), fearful (30%) and stressful (18%), because they were never given any information about menstruation before it occurred. Seventy eight percent (78%) of the participants reported having vaginal discharge before and after menstruation for six months preceding the study. Approximately 67% of the participants did not know about self breast examination (Tazeen, *et al*, 2004).

A qualitative research based study in Karachi found various misconceptions about menstruation. Majority of the girls perceived menstruation as the ability to give birth and bathing as harmful during menstruation and felt it inappropriate to talk about their bodies (Mohammed, 2004). A study conducted by Pakistan Voluntary Health and Nutrition Association (PAVHNA) revealed greater awareness of puberty among boys than girls. According to the study findings, 90% of the boys and 80% of the girls had discussed bodily changes with peers and family members (Sabeeh and Abbas, 2006).

Female adolescents face a number of problems during their reproductive life and especially at the time of puberty, pregnancy and childbirth (Fikree *et al*, 2004). A study on reproductive health awareness in adolescent girls was conducted in Peshawar. Eighty eight percent (88%) of the students in the study clearly expressed their demand for sex education in schools. Girls were shy about discussing menstruation and felt that virginity was a virtue. The study concluded that there was a great need for multidisciplinary educational programmes in schools to give adolescents the right answers at the right time (Majid, 1995).

In a study carried out by Quazi (2003), 74% of the participants in this study reported that the first menstrual experience for them was shocking and fearful and they were unprepared for the trauma of their first menstrual experience. It highlighted the need for the provision of information related to menstruation before the experience to help the adolescents cope with the change effectively.

2.1.6 Sources of information of puberty

Adolescents obtain information of puberty from various sources. In a study among females in Karachi, Pakistan, the major sources of information about sexuality are cable (90%) and internet (35%), whereas only 5% of the participants reported utilization of health magazine as an information source (Tazeen *et al*, 2004). Findings of another survey showed that girls were most likely to hear about puberty from their mothers, sisters and friends. They were less likely to be informed about puberty before it occurred. The study also highlighted that the timing of information of puberty was inadequate as 75% of girls felt that they should have been informed about puberty in advance (Sathar, Haque, Faizunnisa, Sultana, Lloyd, Diers and Grant, 2001).

In a study carried out among adolescents in China, school teachers and mass media were identified as the two most important sources of sex knowledge. Sources of sex knowledge among adolescents on various topics (puberty, sexuality, and STI/HIV/AIDS) differed by the level of taboo associated with these topics in Chinese culture. The percentage of adolescents obtaining knowledge for puberty, sexuality, and STI/HIV/AIDS from teachers declined by topic (45.4, 30.7 and 18.4 percent, respectively), while the percentage of adolescents obtaining knowledge from television/movie increased by topic (6.7, 12.2 and 27.5 percent, respectively). Adolescents obtained knowledge on topics with less taboo (e.g. puberty) from teachers and obtained knowledge on topics with more taboo (e.g. sexuality, STI/HIV/AIDS) from mass media (Liyang *et al*, 2007).

In a study among female adolescents in Klang Valley, the levels of importance of obtaining the sources of information of puberty were categorized as first level of importance: mothers, second level of importance: siblings, third level of importance: fathers, fourth level of importance: friends, fifth level of importance: teachers and finally, sixth level of importance was book/internet (Kamrani *et al*, 2011).

The result of a study among parents and teachers showed that 65.2% of parents and 40.9% teachers have not discussed growth and development issues with their adolescents. Only 5.2% teachers and 1.1% parents discussed sexual aspects with adolescents (Nair *et al*, 2011).

Preferred sources of information about puberty.

Adolescents have sources through which they prefer to get information about puberty. In a study carried out among adolescents in Swaziland, Southern Africa, print/broadcast media was the primary source for HIV/AIDS and sexual risk behaviour information for the students. Most participants preferred information from the healthcare workers. This study suggests a greater role for healthcare providers in providing HIV/AIDS and sexual risk information (Aaron *et al*, 2002).

According to a study conducted among adolescents to identify their source of information and sexual knowledge and behaviour, most of them indicated an adult as their preferred source of information and this trend was particularly strong for virgins (Handelsman, Carbral and Weisfeld, 1987). In a study conducted among female adolescents in Karachi, Pakistan, majority (72%) of the participants believed that they should be given proper information related to puberty and sexual health before and during the time of puberty. School health programmes (45%), television programmes (35%) and magazines (10%) were cited as the sources which could be used to provide information to the adolescents. Eighty percent of the participants believed that topics related to puberty, sexual and reproductive health should be taught as a part of the school curriculum (Tazeen *et al*, 2004).

2.1.7 Misconceptions about puberty

Studies have revealed that majority of female adolescents have very limited information about puberty. A qualitative research based study in Karachi found various misconceptions about menstruation. Majority of the girls perceived menstruation as the ability to give birth and bathing as harmful during menstruation. Most girls felt it inappropriate to talk about their bodies (Mohammed, 2004). Another study found that females were considered unclean while menstruating. Some were made to sleep on a mat on the floor, forbidden to bath, and advised to avoid some foods (Mumtaz and Raouf, 1996).

Also in another study, majority (98%) of the participants had received information from their mothers to avoid bathing (70%), praying or preaching (90%), carrying heavy weight (89%), and eating eggs, beef, and fish during menstruation. Remaining participants reported receiving information from elder sister, or a friend (Tazeen *et al*, 2004).

According to Ten, 2007, the following reveals the restricted control, which many women and girls have over their own mobility and behaviour during menstruation due to their 'impurity' during menstruation, including the myths, misconceptions, superstitions (cultural and/or religious) and taboos concerning menstrual blood and menstrual hygiene:

In the Jewish tradition, menstruating women and everything that they touch is considered to be impure.

Among Hindus, menstruation is considered 'polluting'. During the menstruation period, women and girls are not allowed to visit the temple, pray, or cook. They are not allowed to touch anybody and have to stay away from their family, because they are seen as impure.

Among Muslims, menstruating women are prohibited from touching the Koran and praying for a minimum of three and a maximum of seven days. They are also not allowed to enter the mosque, to fast, or to have sex (Ten, 2007).

These ideas still play a role in several cultures, as a result of which women and girls get various restrictions imposed on them during their menstruation period. Examples from a few countries demonstrate this:

In Bangladesh, menstrual blood is seen as 'the greatest of all pollution (Blanchet, 1987). Menstruating women must stay inside as much as possible. They are not allowed to prepare food or to work in the rice fields. Sex (and sharing a bed with their partner) and praying or reading the Koran are prohibited during this period. On the other hand, the first menstruation of a girl is celebrated. Family, friends and acquaintances are invited for this occasion, special rituals are carried out, and particular dishes are served (Bosch and Hutter, 2002).

In Nepal, the Kumari girls who have the status of living goddesses (incarnations of the goddess Kali), are believed to lose their divine strengths when they start menstruating. They lose their status of living goddess immediately.

In Western Uganda where people keep cows, menstruating girls and women were not allowed to drink milk. It was believed that menstruation would affect the production of milk from the cows to get bloody milk

In the Eastern Uganda, menstruating girls and women were not allowed to plant groundnuts during the planting season, because this would affect the yield.

In Central Uganda menstruation was supposed to be a top secret only known to yourself.

In Sierra Leone, it is believed that used sanitary napkins can be used to make someone sterile.

In Southern Africa, menstrual blood of women is dangerous to men and also to the fertility of cattle and of crops (Kuper, 1982).

Among the Maya and in ancient Japan menstruating women had to isolate themselves in “women’s huts” to carry out rituals and exchange experiences and wisdom. In that period, the men took over the daily chores of the women. This custom still exists in some Asian, African and South American cultures.

In Ethiopia and among certain tribes in Nigeria menstruating women must isolate themselves in menstruation huts, because it is believed that menstrual blood pollutes the home.

In North America, shamans (traditional doctors) prohibit menstruating women from entering the sacred sweat hut.

Among the Aborigines in Australia, female healers treat wounds and contusions with cloth soaked in menstrual blood. The idea is that wounds heal quicker and that no scars are left behind because of this.

Culturally girls of Bahun, Chhetri and Newar caste groups are put in seclusion in a special place in one’s own or relatives’ house (usually kept dark) where they are confined for 7 to 11 days. During this seclusion they are not allowed to see the sun and male relatives (brothers and father). The commonest restriction practiced by the survey respondents is abstaining from religious activities (68%), which are followed by abstaining from cooking (46%) as well as not touching the male family members (24%). The socio-cultural beliefs behind are based on concepts of “pollution” surrounding the conditions of menstruation and usually mothers imparted these beliefs to the girls as important know how related to the practices during menstruation (WaterAid, 2009).

In Suriname, especially among the Creoles and Maroons, menstruating women are not allowed to cook or prepare cakes, or share a bed or a room with their partner. Traditionally a Maroon woman had to isolate herself in a separate hut the moment she starts to menstruate. This menstruation hut was frequently situated at the edge of the village where the woman lived (Ten, 2007).

Nowadays, a woman does not have to isolate herself during her menstruation period, however, she must go to a separate part of the house where she lives. She must also use special pots and pans to cook her food during this period. When she stops menstruating, she can go home to her partner. However, before this happens, she has to wash the clothes she wore during the menstruation period and clean herself by the use of a traditional vaginal steam bath.

Menstrual blood can also be dangerous in the sense that a malevolent person can do harm to the woman or girl by using black magic (*wisi*). It is believed that a woman can also use her menstrual blood to impose her will on a man (Ten, 2007).

For different indigenous people, such as, Indians, menstruating women or girls are treated with respect. When Indians are hiking, pauses are planned for menstruating women or girls, so that they can rest and carry out their rituals (Ten, 2007).

2.1.8 Menstruation

Menstruation is also called menstrual bleeding, menses, catamenia or a period. The flow of menses normally serves as a sign that a woman has not become pregnant. However, this cannot be taken as certainty, as a number of factors can cause bleeding during pregnancy (Ko and Yoon, 2007).

The menstrual cycle refers to the physiological changes that can occur in fertile women for the purposes of sexual reproduction and fertilization. It is a monthly cycle that takes approximately 28 days to complete although this varies from person to person. The menstrual cycle under the control of the endocrine system is necessary for reproduction. The length of a woman's menstrual cycle will typically vary, with some shorter cycles and some longer cycles. A woman who experiences variations of less than eight days between her longest cycles and shortest cycles is considered to have regular menstrual cycles. It is unusual for a woman to experience cycle length variations of less than four days. Length variation between eight and 20 days is considered as moderately irregular cycles. Variation of 21 days or more between a woman's shortest and longest cycle lengths is considered very irregular (Kippley and Sheila, 1996). Menstrual cycles are counted from the first day of menstrual bleeding. Eumenorrhea denotes normal, regular menstruation that lasts for a few days (usually 3 to 5

days, but 2 to 7 days is considered normal) (John, 2007). The average blood loss during menstruation is 35 milliliters with 10–80 ml considered normal (Healy, 2004).

Painful cramping in the abdomen, back, or upper thighs is common during the first few days of menstruation. Severe uterine pain during menstruation is known as dysmenorrhea, and it is most common among adolescents and younger women (affecting about 67.2% of adolescent females) (Sharma, Malhotra, Taneja and Saha, 2008). When menstruation begins, symptoms of premenstrual syndrome (PMS) such as breast tenderness and irritability generally decrease (John, 2007).

Phases of the menstrual cycle

The menstrual cycle is commonly divided into three phases: the follicular phase, ovulation, and the luteal phase.

Follicular phase

This phase is also called the proliferative phase because a hormone causes the lining of the uterus to grow, or proliferate, during this time. During the first days of the cycle, there is a rise in follicle stimulating hormone (FSH) which stimulates a few ovarian follicles. These follicles, which were present at birth and have been developing for the better part of a year in a process known as folliculogenesis, compete with each other for dominance. Under the influence of several hormones, all but one of these follicles will stop growing, while one dominant follicle in the ovary will continue to maturity. The follicle that reaches maturity is called a tertiary or Graafian follicle, and it contains the ovum (Losos, Raven, Johnson and Singer, 2002).

As they mature, the follicles secrete increasing amounts of estradiol, an oestrogen. The oestrogens initiate the formation of a new layer of endometrium in the uterus, histologically identified as the proliferative endometrium. The oestrogen also stimulates crypts in the cervix to produce fertile cervical mucus, which may be noticed by women practicing fertility awareness (Weschler, 2002).

Ovulation Phase

During the follicular phase, estradiol suppresses production of luteinizing hormone (LH) from the anterior pituitary gland. When the egg has nearly matured, levels of estradiol reach a threshold above which this effect is reversed and oestrogen actually stimulates the production of a large amount of LH. This process, known as the LH surge, starts around day 12 of the average cycle and may last 48 hours. The exact mechanism of these opposite responses of LH levels to estradiol is not well understood. In animals, a Gonadotropin-releasing hormone (GnRH) surge has been shown to precede the LH surge, suggesting that estrogen's main effect is on the hypothalamus, which controls GnRH secretion (Weschler, 2002). This may be enabled by the presence of two different estrogen receptors in the hypothalamus: estrogen receptor alpha, which is responsible for the negative feedback estradiol-LH loop, and estrogen receptor beta, which is responsible for the positive estradiol-LH relationship. However in humans it has been shown that high levels of estradiol can provoke abrupt increases in LH, even when GnRH levels and pulse frequencies are held constant, suggesting that estrogen acts directly on the pituitary to provoke the LH surge. The release of LH matures the egg and weakens the wall of the follicle in the ovary, causing the fully developed follicle to release its secondary oocyte (Losos *et al*, 2002). The secondary oocyte promptly matures into an ootid and then becomes a mature ovum. The mature ovum has a diameter of about 0.2 mm (Hu, Gustofson and Feng, 2008).

After being released from the ovary, the egg is swept into the fallopian tube by the fimbria, which is a fringe of tissue at the end of each fallopian tube. After about a day, an unfertilized egg will disintegrate or dissolve in the fallopian tube. Fertilization by a spermatozoon takes place in the ampulla, the widest section of the fallopian tubes. A fertilized egg immediately begins the process of embryogenesis, or development. The developing embryo takes about three days to reach the uterus and another three days to implant into the endometrium. It has usually reached the blastocyst stage at the time of implantation (Losos *et al*, 2002).

In some women, ovulation features a characteristic pain called *mittelschmerz* (German term meaning *middle pain*) (John, 2007). The sudden change in hormones at the time of ovulation sometimes also causes light mid-cycle blood flow (Anon, 2007).

Luteal phase

The luteal phase is also called the secretory phase. An important role is played by the corpus luteum, the solid body formed in an ovary after the egg has been released from the ovary into the fallopian tube. This body continues to grow for some time after ovulation and produces significant amounts of hormones, particularly progesterone (Losos *et al*, 2002). Progesterone plays a vital role in making the endometrium receptive to implantation of the blastocyst and supportive of the early pregnancy, it also has the side effect of raising the woman's basal body temperature (Weschler, 2002).

After ovulation, the pituitary hormones FSH and LH cause the remaining parts of the dominant follicle to transform into the corpus luteum which produces progesterone. The increased progesterone in the adrenals starts to induce the production of estrogen. The hormones produced by the corpus luteum also suppress production of the FSH and LH that the corpus luteum needs to maintain itself. Consequently, the level of FSH and LH fall quickly over time, and the corpus luteum subsequently atrophies (Losos *et al*, 2002). Falling levels of progesterone trigger menstruation and the beginning of the next cycle. From the time of ovulation until progesterone withdrawal has caused menstruation to begin, the process typically takes about two weeks, with 14 days considered normal. For an individual woman, the follicular phase often varies in length from cycle to cycle, by contrast, the length of her luteal phase will be fairly consistent from cycle to cycle (Weschler, 2002).

The loss of the corpus luteum can be prevented by fertilization of the egg, the resulting embryo produces human chorionic gonadotropin (hCG), which is very similar to LH and which can preserve the corpus luteum. Because the hormone is unique to the embryo, most pregnancy tests look for the presence of hCG (Losos *et al*, 2002).

2.1.9 Premenstrual syndrome (PMS)

Premenstrual syndrome refers to the collection of symptoms or sensations women experience as a result of high hormone levels before and sometimes during their periods.

Common physical symptoms of PMS are water retention, breast tenderness, and weight gain, while common emotional and behavioural symptoms include depression, irritability, and mood swings. PMS has a wide variety of physical, emotional, and behavioural symptoms that

vary greatly from woman to woman and from cycle to cycle. Symptoms may range from mild to severe.

While there is no cure for PMS, many women can improve their symptoms by getting regular exercise, eating a healthy diet, limiting their alcohol and caffeine intake, and reducing stress. Nonprescription pain relievers can help reduce some symptoms. Prescription medicines may be necessary for women who have severe PMS that significantly interferes with their lives on a regular basis (Romito and Jones, 2010).

One type of PMS is characterized by anxiety, irritability and mood swings. These feelings are usually relieved with the onset of bleeding. Most likely, this type relates to the balance between estrogen and progesterone. If estrogen predominates, anxiety occurs. If there's more progesterone, depression may be a complaint.

Sugar craving, fatigue and headaches signify a different type of PMS. In addition to sugar, women may crave chocolate, white bread, white rice, pastries, and noodles. These food cravings may be caused by the increased responsiveness to insulin related to increased hormone levels before menstruation. In this circumstance, women may experience symptoms of low blood sugar; their brains are signaling a need for fuel. A consistent diet that includes complex carbohydrates will provide a steady flow of energy to the brain and counter the ups and downs of blood sugar variations (Lark, 2012).

Cramps and other sensations

Women can experience a variety of sensations before, during or after their menses. Common complaints include backache, pain in the inner thighs, bloating, nausea, diarrhea, constipation, headaches, breast tenderness, irritability, and other mood changes. Women also experience positive sensations such as relief, release, euphoria, new beginning, invigoration, connection with nature, creative energy, exhilaration, increased sex drive and more intense orgasms.

Uterine cramping is one of the most common uncomfortable sensations women may have during menstruation. There are two kinds of cramping:

1. Spasmodic cramping is probably caused by prostaglandins, chemicals that affect muscle tension. Some prostaglandins cause relaxation, and some cause constriction. A

diet high in linoleic and linolenic acids, found in vegetables and fish, increases the prostaglandins for aiding muscle relaxation.

2. Congestive cramping causes the body to retain fluids and salt. To counter congestive cramping, avoid wheat and dairy products, alcohol, caffeine, and refined sugar (Nelson, 2009).

Natural options to alleviate cramping:

- Increase exercise. This will improve blood and oxygen circulation throughout the body, including the pelvis.
- Avoid red meat, refined sugars, milk, and fatty foods.
- Eat lots of fresh vegetables, whole grains (especially if you experience constipation or indigestion), nuts, seeds and fruit.
- Avoid caffeine. It constricts blood vessels and increases tension.
- Drink ginger root tea (especially if you experience fatigue).
- Breathe deeply, relax, notice where you hold tension in your body and let it go.
- Take time for yourself (Nelson, 2009).

2.1.10 Kinds of problems women have with their periods

Women can have a range of problems with their periods. They are as follows:

Amenorrhea (the lack of a menstrual period): This term is used to describe the absence of a period in:

- Young women who have not started menstruating by age 15
- Women and girls who have not had a period for 90 days even if they have not been menstruating for long.

Causes can include:

Pregnancy, breastfeeding, extreme weight loss, eating disorders, excessive exercising, stress, and serious medical conditions in need of treatment (WHO, 2011).

Dysmenorrhoea: this means painful periods, including severe cramps. Period pain occurs just before or during the menstrual periods. It is a very common condition in adolescents. The pain can be continuous or could come in bouts. It generally starts in the lower abdomen and

moves to the lower part of the back and the inner part of the thighs. It is most severe in the early days of the period and gradually reduces in severity as the period continues.

In girls and young women, the pain is not associated with an underlying medical problem in the majority of the cases. It is due to a natural chemical substance called hormones – produced in the body during the periods, which cause the muscles of the uterus to tighten. The level of this chemical substance is higher in the first 2–3 days of the period; that is when the pain is most severe.

If the pain is very severe, it may be accompanied by headache, diarrhoea, nausea and vomiting. These symptoms too are caused by the action of the chemical substance. If the pain is severe it can make it difficult for one to carry out daily activities. It can also affect one's mood. However, there are no long term negative effects of the pain or other symptoms (WHO, 2011).

Menstrual cramps in teens are caused by too much of the chemical called prostaglandin. Most teens with dysmenorrhoea do not have a serious disease, even though the cramps can be severe.

In older women, the pain is sometimes caused by a disease or condition such as uterine fibroids or endometriosis. For some women, using a heating pad or taking a warm bath helps ease their cramps. Some over-the-counter pain medicines such as Ibuprofen can also help with these symptoms (Nelson, 2009).

Note: Aspirin or paracetamol can be substituted but they are not as effective as ibuprofen. If the above approach has been tried for three months with no improvement in period pain, combined oral contraceptives can be used (WHO, 2011).

Menorrhagia: This means having heavy flow during periods. Women who experience menorrhagia are more susceptible to iron deficiency than the average person. In this condition one's menstrual bleeding is heavier than normal and is often irregular (Harvey, Armah and Dainty, 2005).

The causes of the condition

In adolescents, the most common reason for this is that the body is still developing and is not fully mature yet. In the first few months, after the menstrual periods begin, the body's method of regulating the periods is still developing and it is not uncommon for the periods to be irregular and for the bleeding to vary a lot during this time. It can take several months for the periods to become regular and for the variation in bleeding to decrease.

Some contraceptive methods, such as DMPA (Depot-medroxyprogesterone acetate) injections or IUD (intrauterine devices) can cause excessive or irregular bleeding. It takes some time for the body to adjust to these methods. Less commonly, bleeding disorders can cause excessive bleeding.

The effects of the condition

Excessive bleeding during one's periods can lead to a condition called anaemia in which the thinned blood is not able to carry adequate oxygen to the different parts of the body leaving the person feeling tired and weak.

There are a number of types of medication that one can use to reduce the amount of bleeding. These medications include:

- non-steroidal anti-inflammatory drugs such as ibuprofen
- tranexamic acid

These work best if one uses them early in the period. An alternative is to take combined oral contraceptive pills regularly, every day throughout cycle. This method can be used even if you do not need protection against pregnancy.

If anaemia occurs as a result of excessive bleeding, treatment with iron and folic acid tablets may be required. Women who bleed heavily often have low iron stores even if they are not anaemic. To prevent anaemia it is advised that a low dose of iron and folic acid tablets is taken for three months (WHO, 2011).

Irregular period

Menstrual periods are irregular when the time between the first day of one period and the first day of the next period is usually less than 21 days or more than 35 days. They are also considered irregular if the time interval between the shortest and the longest menstrual periods

differ by more than 20 days (e.g. some periods are 20 days apart, some are 41 days apart). Bleeding in between periods can occur. Occasionally, some adolescents experience bleeding in between their periods. This can vary in amount from spotting (small amounts of blood) to frank bleeding (WHO, 2011).

Causes of irregular menstrual period

- Menstrual irregularity of early adolescence.
After the first period, it takes some time for the periods to become regular. In some cases, this may take up to two years. This is perfectly normal as the body of the adolescent girl matures.
- Irregular periods or bleeding between periods associated with hormonal contraceptives.
Bleeding in between periods can also happen in the first few months after starting certain types of contraception – oral contraceptive pills or depot-medroxyprogesterone acetate (DMPA) injections.
- Irregular periods or bleeding between periods possibly due to an underlying cause.
Sometimes irregular periods can be due to undernutrition. Less often, medical conditions, especially those that are related to an imbalance of hormones (i.e. natural chemicals produced by the body that help regulate periods) can cause the menstrual period to be irregular or to stop all together.

If the irregular periods are not associated with underlying causes there are no adverse effects. Occasionally, underlying causes such as under nutrition, thyroid disease or a bleeding disorder can cause irregular periods. In this case, the underlying cause will need to be treated (WHO, 2011).

2.1.11 Menstrual hygiene

Hygiene-related practices of women during menstruation are of considerable importance, as it has a health impact in terms of increased vulnerability to reproductive tract infections (RTI) (Dasgupta and Sarkar, 2008). Poor menstrual hygiene is one of the major reasons for the high prevalence of RTIs in the country and contributes significantly to female morbidity (Garg *et al*, 2011). The interplay of socio-economic status, menstrual hygiene practices and RTI are noticeable. Today millions of women are sufferers of RTI and its complications and often the

infection is transmitted to the offspring of the pregnant mother. Women who have good knowledge of menstrual hygiene and safe practices are less vulnerable to RTI and its consequences. Therefore, increased knowledge about menstruation right from childhood may escalate safe practices and may help in mitigating the suffering of millions of women (Dasgupta and Sarkar, 2008). To manage menstruation hygienically and with dignity, it is essential that women and girls have access to water and sanitation. They need somewhere private to change sanitary cloths or pads, clean water and soap for washing their hands, bodies and reusable cloths and facilities for safely disposing of used materials or a clean place to dry them if reusable. There is also a need for both men and women to have a greater awareness of good menstrual hygiene practices (Mahon, Cavil and House, 2012).

Why menstrual hygiene matters

Globally, approximately 52% of the female population (26% of the total population) is of reproductive age. Most of these women and girls will menstruate each month for between two and seven days (Mahon *et al*, 2012).

Menstrual hygiene: a neglected issue

Women and girls are often excluded from decision making and management in development and emergency relief programmes. At the household level, they generally have little control over their access to a private latrine or money to spend on sanitary materials. Even when gender inequalities are addressed, deeply embedded power relations and cultural taboos persist. Most people and men in particular, find menstrual hygiene a difficult subject to talk about. The practical challenges of menstrual hygiene are made even more difficult by socio-cultural factors and millions of women and girls continue to be denied their rights to water, sanitation, and hygiene, health, education, dignity and gender equity (Mahon *et al*, 2012).

The following studies reveal the level of menstrual hygiene among adolescent girls:

In a study carried out among secondary school girls in Southeastern Nigeria to determine their perception, problems and practices on menstruation, it was discovered that 55.7% of the respondents used unsanitary menstrual absorbent during menstruation (Echendu *et al*, 2008).

In a study among secondary school girls in Ile Ife, Osun State Nigeria, 66.3 %, used unsanitary materials as menstrual absorbent (Abioye-Kuteyi, 2000).

In a study conducted among rural adolescent girls in Uttarakhand, India, most of them use rags and old clothes during menstruation, increasing susceptibility to RTI's (Garg *et al*, 2011).

In a study conducted among adolescent girls in Uttarakhand, 38.4 % adolescent girls (48.1% Rural and 27.6% Urban) were using sanitary napkins as menstrual absorbent, while 30% were using a new cloth/rag every time (Juyal, Kandpal, Jayanti, Negi, 2011).

In a study among adolescent girls of a secondary school situated in the field practice area of Rural Health Unit and Training Center, Singur, West Bengal, India, only 18 (11.25%) girls used sanitary pads during menstruation, 68 (42.5%) girls used old cloth pieces and 10 (6.25%) girls used new cloth pieces. Sixty-four (40%) girls used both cloth pieces and sanitary pads during menstruation. For cleaning purpose, 156 (97.5%) girls used both soap and water. More than half of the girls (51.3%) were ignorant about the use of sanitary pads during menstruation (Dasgupta *et al*, 2008).

In a study among adolescent school girls in Nepal, hygiene practices were found to be not so satisfactory. In the survey, only half of the respondents (51.0%) mentioned having taken their bath everyday and about two-fifth (43.0%) on alternate days, during their last menstruation. In the FGD, however, most of the girls said that it is difficult to take bath daily in winter and usually take bath on alternate days while in summer they do so daily. Many respondents mentioned that, even if not on other days, they usually take bath on the third or fourth day of menstruation as a purifying ritual. Regarding the actual material used, 33% used disposable sanitary pad, 40% used new cloth whereas as about a fourth (26.0%) used old piece of cloth from sari or scarf (WaterAid, 2009).

According to a presentation made by Fernandez, during the 2010 world water week in Stockholm, the following are the findings in rural India:

Eighty nine percent of the respondents use cloth as absorbents, 2% respondents use pieces of cotton, 7% use sanitary napkin, 2% use ash.

Thirty eight percent of the respondents from Sheopur of Saharia tribe disclosed that they spend their days of menstruation in the cow shed.

Half (50%) of the respondents are not aware of the sanitary napkin.

Diseases reported were white discharge (48), leucorrhoea (2), itching / burning (277), ovaries swelling (15), cuts on thighs (9) and frequent urination (4).

Thirty seven percent of the respondents did not have access to a household toilet as a result they are compelled to manage during menstruation at places like bathroom, open area, cow shed, dark room.

Very few schools of India have access of sanitary napkin and menstrual waste disposal facility.

An assessment in Pali Block, CG revealed that none of the shops from 65 villages stock sanitary napkin or other protection products (Fernandez, 2010).

The perception and appropriate hygiene practices of girls towards menstruation is closely linked with their level of knowledge and beliefs. In a study carried out among adolescent girls in Sokoto, Nigeria to assess the level of knowledge on menstruation and hygiene practices, majority (87%) of the girls used sanitary pads only. There was a significant statistically association between education of their mothers, religion and occupation of respondents' mother with respect to the reported menstrual hygiene practices (Oche, Umar, Gana and Ango, 2011).

In the study carried out among female nursing students in Ibadan, Nigeria showed that 70% of the respondents used sanitary pad to manage their menstruation (Moronkola *et al*, 2006).

Impact of poor menstrual hygiene

Impact on education

Many schools do not support adolescent girls or female teachers in managing menstrual hygiene with dignity. Inadequate water and sanitation facilities make managing menstruation very difficult, and poor sanitary protection materials can result in blood-stained clothes causing stress and embarrassment.

Teachers (and male members of staff in particular) can be unaware of girls' needs, in some cases refusing to let them visit the latrine. As a result, girls have been reported to miss school during their menstrual periods or even drop out completely (Mahon *et al*, 2012).

Impact on health

Menstruation is a natural process. However, if not properly managed it can result in health problems (Mahon *et al*, 2012). Poor menstrual hygiene is linked to lower reproductive tract infections, urinary tract infections, bacterial vaginosis, vulvovaginal candidiasis, dysmenorrhoea and also has linkages with anaemia and infertility (Patkar, 2011). The impact of poor menstrual hygiene on the psycho-social wellbeing of women and girls (e.g. stress levels, fear and embarrassment, and social exclusion during menstruation) should also be considered (Mahon *et al*, 2012).

Impact on sustainability of water and sanitation services and behaviour change

Neglecting menstrual hygiene could also have a negative effect on the sustainability of water, sanitation and hygiene programmes. Failing to provide disposal facilities for used sanitary pads or cloths can result in a significant solid waste issue, with latrines becoming blocked and pits filling quickly. Failure to provide appropriate menstrual hygiene facilities at home or school could also prevent water, sanitation and hygiene services being used by the intended users all the time (WaterAid, 2009).

Impact on social exclusion

Taboos surrounding menstruation exclude women and girls from many aspects of social and cultural life as well as menstrual hygiene services. Such taboos include not being able to touch animals, water points, or food that others will eat, and exclusion from religious rituals, the family home and sanitation facilities. As a result, women and girls are often denied access to water and sanitation when they need it most. Well designed and appropriate water, sanitation and hygiene facilities that address menstrual hygiene can make a significant difference to the schooling experience of girls (Mahon *et al*, 2012).

2.1.12 Menstrual hygiene management

Menstrual hygiene management is defined holistically as the articulation, awareness, information and confidence to manage menstruation with safety and dignity using safe hygienic materials together with adequate water and agents and spaces for washing and bathing and disposal with privacy and dignity. Menstrual hygiene management is not the

production and distribution of sanitary pads or hygiene education on its own. The combination of all the three dimensions is essential for ensuring that girls and women are able to break taboos and demand adequate facilities for menstrual hygiene and management that suit their needs (Patkar, 2011).

Menstrual hygiene products

Menstrual hygiene products can be divided into two basic categories: sanitary pads and tampons. Once a girl starts menstruating, she needs to choose from the various menstrual hygiene products which are available.

Absorbency and a comfortable fit are the main features girls need to look for when purchasing menstrual products. Because a girl's menstrual flow may vary from day to day during the cycle, she may want to use different types of products during her period (Krapp, Wilson, Cengage, 2005). When a girl has her period she can use sanitary towels (also known as sanitary pads, panty liners, sanitary napkins) or tampons to soak up the blood. Different girls find different methods work best for them, however most start by using sanitary towels.

Sanitary towels: They are thin pads made of a soft cotton-like material. Sanitary pads are worn inside the underwear where they collect the menstrual flow. They come in different sizes, thicknesses, and styles. Some pads have flaps or wings that wrap around and attach to the underside of underwear. Others have deodorant and contain perfume. Some girls find that the perfume irritates their skin (Krapp *et al*, 2005). A sanitary towel should be changed every few hours during the day, even if the flow of blood is not very great (Anon, 2013). Reuse of cotton sanitary napkins requires the availability of soap, the presence (accessibility) of clean running water and sufficient private washing facilities that do not harmfully affect the amount of drinking water, which is sometimes limited in developing countries. The advantage of this type of menstrual sanitary material is that the chance of skin irritations is smaller. Synthetic sanitary napkins are not environmentally friendly, unless degradable (Ten, 2007).

Tampon: A tampon is like a small rolled up piece of cotton wool with a string at one end. A girl pushes a tampon into her vagina leaving the string hanging outside her body. The string is then used to pull the tampon out. Some tampons also come with applicators that helps to

insert the tampon (Anon, 2013). The applicators may be in varieties of plastic or cardboard (Krapp *et al*, 2005). Tampons come in different thicknesses so one can use a thicker one when the bleeding is heavier and thinner ones for lighter bleeding (Anon, 2013).

For some girls, inserting a tampon can be cumbersome, painful or awkward. Moreover, lack of hygiene can lead to infections. In cultures where girls must get married as a virgin, the fear that the hymen tears when using this menstrual protection alternative will not encourage the use of this product (Ten, 2007). Tampons are comfortable to wear and may be a good choice for active girls. They should be inserted carefully to avoid any irritation. A rare, but serious, condition called Toxic Shock Syndrome (TSS) can be connected to tampon use. The higher the absorbency of tampons used, the higher the risk for TSS. To decrease the risk of TSS, girls should choose the lowest absorbency necessary to absorb the flow (Krapp *et al*, 2005).

Tampons should also be changed regularly and it is generally advised that a tampon should not be left unchanged for more than 8 hours. This is because TSS can be caused by leaving a tampon in for too long. This is why it is best not to use tampons overnight. It is fine to use a sanitary towel overnight without changing it. When a tampon is inserted into the vagina, there is no problem about going to the toilet. If a girl is using a tampon, it is best to take it out before having a bath or shower and use a new one afterwards. It is fine to use a tampon in the swimming pool if a girl wants to go swimming while she has her period. Sanitary towels cannot be used while swimming (Anon, 2013).

Menstrual cups are also available in some countries. These are small latex or silicone cups that are inserted into the vagina to collect the blood. The most common type of cup is reusable and can last for many years (Nelson, 2009).

Soft cup

The soft cup is a soft flexible plastic cap that is placed around the mouth of the uterus. From this hangs a small bag that catches the menstruation blood. The soft cup can stay in place for 24 hours. Then it is taken out, disposed and replaced by a new one. The soft cup has several advantages: it can be used for a longer period without producing bad smells, the costs of the production of disposable sanitary napkins can be saved, and this type of menstrual sanitary

product limits the quantity of waste. When travelling and at places where other protection alternatives are not easily available, the soft cup is ideal. Moreover, it takes up little space due to its small size. However, there are also disadvantages. Inserting the cup can be cumbersome, painful or awkward for girls. In cultures where girls must get married as a virgin, the fear that the hymen tears when using the soft cup will not encourage the use of this product. In comparison with sanitary napkins and tampons, a disadvantage of the soft cup is that it can be used only once; therefore, it is expensive which makes it financially out of reach for girls and women in the developing world, who frequently must manage to live on US\$ 1 dollar or less (Ten , 2007).

Keeper

The keeper is a flexible cup of natural rubber that is used internally to collect menstrual blood. The keeper has a life span of at least ten years. The protection alternative has several advantages: it provides a saving on the production of throwaway sanitary napkins and limits the quantity of waste. When travelling, and at places where other protection alternatives are not easily available, the keeper is ideal. It takes up little space, however, it also has some disadvantages. Inserting the keeper can be cumbersome, painful or awkward for girls. In cultures where girls must get married as a virgin, the fear that the hymen tears when using the keeper will not encourage the use of this product (Ten, 2007).

In areas where these types of sanitary protection are not commonly used, or if they are too expensive to afford, many women will use rags or old strips of cloth or toweling to soak up the blood. It is important for a girl to wash her vaginal area daily. Used sanitary towels and tampons should be wrapped up and put in a bin (Anon, 2013).

2.2 Empirical Review

2.2.1 Experience of menstruation

One of the significant things that occur in puberty is the onset of menstruation. Menstruation is a natural phenomenon which is an important indicator of women's health (McPherson and Korfine, 2004). Menarche is the first time females experience menstruation. This is a strong indicator of puberty in females and many factors can influence the age of menarche (Nielsen, 2011). Menarche correlates with age at onset of puberty and breast development. In girls with

early onset of breast development, the interval to menarche is longer (3 years or more) than in girls with later onset (Marti-Henneberg and Vizmanos, 1997). By 15 years of age, 98% of females will have had menarche (Chumlea and Schubert, 2003).

The age of menarche at which females start their periods had been reported to be decreasing over the years (Chang, Shiow and Kuahng, 2008).

In the early years of menstruation, the flow is not regular each month but with time, it becomes regular and occur every month. Some adolescents will experience a normal cycle length, short cycle or long cycle. In a study conducted among female adolescents in Hong Kong, at the first menstrual year, only 76.4% of girls had a normal cycle length (21-35 days); 8.6% and 15.0% had short (<21 days) and long cycles (>35 days), respectively (Chan, Yiu, Yuen, Sahota and Chung, 2006). By the third year after menarche, 60% to 80% of menstrual cycles are 21 to 34 days long, as is typical of adults (Hickey and Balen, 2003).

Menarche is a normal female biological milestone and abnormalities of menstruation are a major gynaecological problem in adolescence. Menstrual disorders include menstrual irregularity, menorrhagia, dysmenorrhoea, and other related symptoms. Among these, dysmenorrhoea is the most common, being reported in 60 to 90% of adolescents and a frequent cause of absenteeism from school or restriction of daily activity. (Poureslami and Osati-Ashtiani, 2002; Harlow and Campbell, 2004; Houston, 2006; Sanyal and Ray, 2008 and Esimai and Esan, 2010).

Pain or cramping sensations in the lower abdomen may be accompanied by headaches, dizziness, diarrhoea, a bloated feeling, nausea and vomiting, backache and leg pains (El-Gilany, Badawi and El-Fedawy, 2005). These symptoms are reported to be the most common reasons for adolescents visiting a gynaecologist (Sanyal and Ray, 2008).

Menstrual irregularity is reported in 43 to 62% of girls during the first year of menstruation and in some it persists for 3 to 5 years (Chan *et al*, 2006).

In a study conducted among female adolescents in India, 58 girls (44.6%) suffered from various menstrual problems, commonest being dysmenorrhoea among 53 girls (40.7%). Three girls (2.3%) suffered from irregular menses, only 1 girl (0.8%) experienced menorrhagia and only 1(0.8%) girl experienced both menorrhagia and dysmenorrhoea (Singh *et al*, 1999). Also in a study among female adolescents in Hong Kong, dysmenorrhoea occurred in 68.7% of the

girls and its prevalence increased significantly with menstrual age. Among those that experienced dysmenorrhoea, the pain was always present in 16%, while 37% and 47% reported having pains frequently and occasionally, respectively. Besides dysmenorrhoea, 37.7% of the girls reported other menstruation-related symptoms which include: dizziness (30.2%), anxiety (29.7%), breast tenderness (27.9%), headache (27.5%), change of bowel habit (25.6%), abdominal pain (24.2%), back pain (24.2%), abdominal bloating sensation (24.2%), fatigue (24.2%), and nausea (6.2%). The prevalence of these symptoms significantly increased with the menstrual year. Overall, the prevalence of menstrual problems including menorrhagia was 77.9%. The girls who have started menstruating (33.6%) reported reduced daily activity because of menorrhagia, and 12.1% reported absenteeism from school because of menstruation related symptoms (Chan *et al*, 2006).

Attitudes to menstruation are also poorly understood. Anxiety, fear, anger, confusion, shame, disgust and even depression are frequently reported by girls during their first menstrual experiences (McPherson and Korfine, 2004).

Previous research findings have suggested a significant relation between menstrual experiences and socio-cultural aspects, such as ethnical background, urbanization, education and occupation, among others (Dorn, 2009). In addition, perpetuations of cultural menstrual taboos and messages, such as menstruation as a shameful and dirty situation or as something intimidating, may have direct or indirect negative inferences on the beliefs of girls at menarche and therefore on their future menstrual experiences (McPherson and Korfine, 2004).

The literature contains a large number of findings about menstruation as a negative psychological experience and as a time when women must cope with considerable psychological and physical changes. It is described as a traumatic experience for some women, which can even affect their future life prospects (Harlow and Campbell, 2004).

It has been found that women suffering from dysmenorrhoea are more predisposed to psychological disorders such as mood changes, depression, anxiety and somatization (Chen and Chen, 2005).

In a study among Lebanese female adolescents to explore dysmenorrhoea and menstrual experiences among them 80.7% of them reported suffering mood changes at menstruation (Santina, Wehbe and Ziade, 2012). Dysmenorrhoea has previously been described in negative

terms among adolescents and is significantly associated with negative menstrual experiences (McPherson and Korfine, 2004).

2.2.2 Health-seeking behaviour

Studies have shown the pattern of health-seeking behaviour of female adolescents that experience menstrual problems. In a study among female adolescents in Hong Kong, only 6.4% had sought medical advice. Among them, 51.3% consulted gynaecologists, 25.7% family doctors, 5.8% paediatricians, and 4.1% Chinese herbalists. The majority of the girls (62.5%) did not take analgesics, while they were always required by 5.8%, and sometimes by 31.6% (Chan *et al*, 2006). In a study conducted among female adolescents in India, only 3 girls out of 58 (5.2%), consulted a doctor, 13 (22.4%) took medications from the chemist shops, 2 girls (3.4%) took herbal medicines from traditional medical practitioner, and 2 girls did not use any medications and took rest for relieving the symptoms (Singh *et al*, 1999). In a study among Lebanese female adolescents, only 7.3% of girls sought medical advice (Santina, Wehbe and Ziade, 2012).

According to the study conducted among the female adolescents in Hong Kong, the factors affecting the decision to seek medical attention were the severity of the symptoms (85.2%), opinion of a family member (75.7%), the doctor's gender (68.7%), anxiety about facing embarrassing questioning (65.3%), cost of the consultation (57.4%), worry about physical examination (56.6%), and time constraints (52.9%). The majority of the girls preferred seeking advice from their family members (70.0%) and friends (40.7%), while only 12.7% and 6.5% preferred advice from doctors and teachers, respectively. They would also seek information from other sources which included: newspapers or books (24.3%), the internet (12.3%), television or radio programmes (11.9%), and health talks (8.5%) (Chan *et al*, 2006). Cultural beliefs about menstruation affects the attitudes of adolescents towards it, which in turn may influence their views (Chan *et al*, 2006).

In the traditional Indian society, talks on such topics like menstruation are regarded as taboo and open discussion on these issues are discouraged. This leads to culmination in repression of feelings which can cause intense mental stress and seeking health advice from quacks and persons who do not have adequate knowledge on the subject. Such health-seeking behaviour

by the adolescent girls is undesirable. Moreover, the routine health services do not have provisions for adequate care of adolescent health problems (Singh *et al*, 1999).

2.3 Theoretical Framework

The PRECEDE model was used for this study.

2.3.1 Precede Model

This model was developed as a planning framework from which health education and health promotion programmes could be designed (Green & Kreuter, 1991). PRECEDE stands for Predisposing, Reinforcing, and Enabling Factors in Educational Diagnosis and Evaluation.

For the purpose of this study, the Predisposing, Reinforcing, and Enabling factors of the PRECEDE model was applied to knowledge, sources of information and experiences of puberty among female adolescents in junior secondary schools.

- Predisposing factors which include knowledge, attitudes, beliefs, personal preferences, existing skills, and self-efficacy towards the desired behaviour change.

Knowledge of the physical and emotional changes that take place during puberty and the various sources of information available on puberty will lead to good knowledge of puberty. Knowledge of the health care services available within the environment will affect the health-seeking behaviour of the young female adolescents who experience menstrual problems.

Personal beliefs about puberty can affect the knowledge and experience of puberty. Beliefs that menstruation is a sickness and anybody who is menstruating should avoid some activities like cooking, physical exercise, carrying heavy objects, going to certain places, and also to avoid eating certain foods like eggs, beef, fish etc will influence the knowledge and experience of puberty in a negative way but beliefs that menstruation is a normal occurrence during the period of adolescence and anybody who is menstruating should not avoid some activities and some food items will influence the knowledge and the experience of puberty in a positive way.

Community beliefs about puberty can also lead to good or poor knowledge of puberty. In the community where they have beliefs that anybody menstruating should not go out of the house, bath, cook for the family, touch the male members of the family or eat certain food items will influence the knowledge and experience of puberty negatively but in the community where

they have a belief that menstruation is normal and anybody who is menstruating can carry out her normal activities will influence the knowledge and experiences of puberty positively.

- Enabling factors which are skills or physical factors such as availability and accessibility of resources or services that facilitate achievement of motivation to change behaviour.

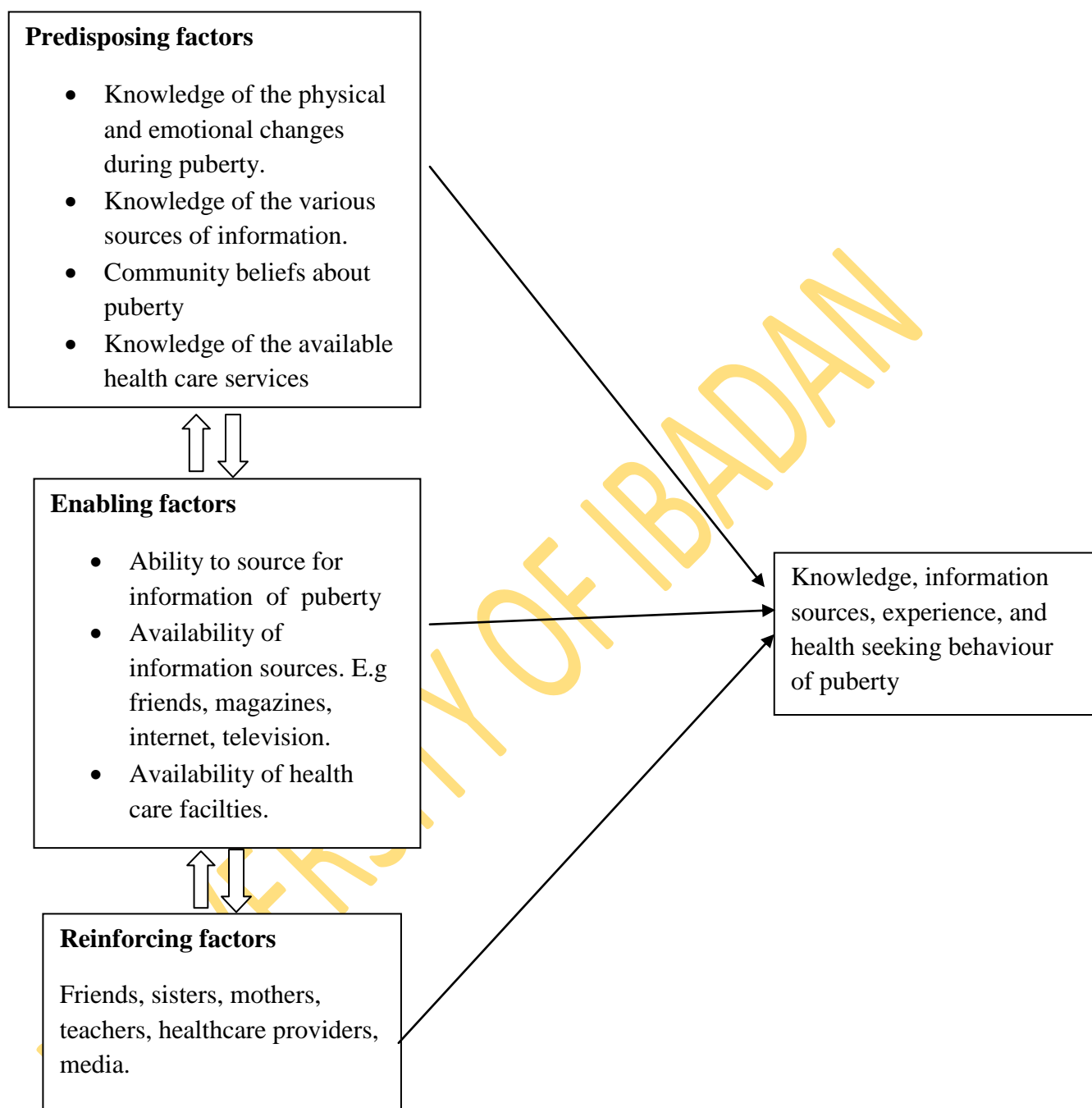
Availability and accessibility of health care facilities in the environment and financial resources will give rise to health-seeking behaviour of adolescents but when financial resources and health care facilities are not available, it will give rise to poor health-seeking behavior among the female adolescents.

Availability and accessibility of information sources e.g friends, magazines, internet, television will influence the knowledge and the experience of puberty among these adolescents in a positive way and lack of these information sources will influence the knowledge and experiences of puberty negatively among the female adolescents.

- Reinforcing factors which includes factors that reward or reinforce the desired behaviour change like the influence of significant others, social support, economic rewards and changing social norms.

The influence of significant others like mothers, sisters, friends, healthcare providers and other factors like media can affect positively or negatively the knowledge, information sources, experience and health-seeking behaviour of puberty. When mothers and sisters give puberty education to the girl child, provide sanitary pads during menstruation, it will lead to good knowledge and practice of menstrual hygiene among the female adolescents.

When healthcare providers who attend to the female adolescents provide puberty education while providing healthcare, it will also influence the knowledge and experience of puberty positively among the female adolescents.



Source: (Green and Kreuter, 1991).

Fig. 2.2. PRECEDE model applied to knowledge, information sources and experiences of puberty.

CHAPTER THREE

METHODOLOGY

3.1 Study design

The study design was descriptive and cross sectional because it described the characteristics of the population that was studied and involved data collection from the study population at a specific point in time and was aimed at assessing the knowledge, information sources, experiences as well as health-seeking behaviour of puberty among female adolescents in junior secondary schools in Ibadan South-West LGA.

3.2 Study Area

Ibadan South-West is a Local Government Area in Oyo State, Nigeria. It was created on 27th August, 1991 during the regime of Gen Ibrahim Babangida (rtd). Its administrative headquarters is at Oluyole estate within the office complex of the former Ibadan Metropolitan Planning Authority along Bashorun M.K.O. Abiola way (former ring road) in Ibadan. It has a land mass of about 244.55 km square and this feature makes it one of the largest Local Government in Oyo state and 12 political wards in the LGA. It has a population of 283,098 as at 2006 census. The population of adolescents is 56,787 and the population of female adolescents between 10-14 years is 15,100. It is bounded by Ibadan North West and Ido Local Government in the North, Oluyole Local government in the South and by Ibadan North and South East Local Government in the East. There are two secondary health facilities, Primary Health Care facilities, private hospitals and patent medicine vendors within the Local Government.

There are 27 public secondary schools comprising both 20 mixed and 7 single sex schools in the Local Government. In the schools a co-curricular activity is being organized once in a week (every Thursday between 8-10 a.m) by the school authority and resource persons from the school, Non-governmental organizations, government parastatals, National Youth Service Corps, tertiary institutions etc educate the students on various topics including life skills, leadership, health, career choice etc.

3.3 Study sites:

The study was conducted in five (5) schools. There are 12 wards in the LGA and only five have schools located in them. These 5 wards (8, 9, 10, 11, 12) were selected for the study.

Wards	Study site	Year of establishment
8	Oke-Bola Comprehensive High School	1979
9	People's Girls Grammar School	1980
10	Oke-Ado High School	1980
11	Community Grammar School, Elewura	1980
12	Apata Community Grammar School.	1980

3.4 Study population

The study populations are female adolescents in public junior secondary schools in Ibadan South-West LGA.

3.5 Inclusion criteria

Female adolescents between the ages of 10-14 years in junior secondary school 1 to junior secondary school 3 in mixed and single sex public schools that willingly gave informed consent were recruited for the study.

3.6 Exclusion criteria

Not fulfilling the inclusion criteria.

3.7 Sample size determination

The sample size was calculated using the Leshie Kish's formula:

$$n = \frac{z^2 pq}{d^2}$$

where:

n = the desired sample size (>10,000)

z = the standard normal deviate usually set at 1.96 = 95% CI

p=53.6%. Adolescents' knowledge about adolescence, puberty and sexuality (Gomes *et al*, 2002)

$$q = 1.0 - p$$

$$d = 0.05$$

$$n = \frac{3.84 \times 0.536 \times 0.464}{0.0025} = 382$$

Non response rate (10%)

$$382 \times 0.1 = 38.2$$

The sample size was increased to 420 to adjust for non response.

3.8 Sample selection

A multistage sampling technique was employed.

Stage 1: All the 5 wards in the LGA with secondary schools located in them were selected.

Stage 2: One school was purposively selected from each of the 5 wards based on population density. All the single sex (girls only) schools are located in one ward (ward 9) and the mixed schools are located both in ward 9 and the other wards (8, 10, 11, and 12). In ward 9, a single sex school was selected and in wards 8, 10, 11, 12, a mixed school was selected each.

Stage 3: Within each selected school, the arms of the school were randomly selected. The junior secondary schools are grouped into junior school I and junior school II arms. One of the arms of the junior schools was selected from each school.

Stage 4: Proportionate sampling was used to obtain the number of students that was required from each school and class. This was done by getting the total number of female students in J.S.S.1, 2 and 3 in the five selected schools and using the total number obtained from each school to do a proportionate calculation in order to get the number required from each school and class. (See appendix V and VI)

Stage 5: A random sampling technique was used to select the students that participated in the study.

The six (6) FGDs conducted were selected from the five schools. Two (2) FGDs each were conducted for those in J.S.S.1, J.S.S.2 and J.S.S.3 each.

About ten (10) students were selected from each class and the respondents that participated in filling the questionnaire did not take part in the FGD.

In Oke-Bola Comprehensive High School, the FGD discussants were selected from J.S.S.2.

In People's Girls Grammar School the FGD discussants were selected from J.S.S.1 and J.S.S.3.

In Oke-Ado High School the FGD discussants were selected from J.S.S.1 class.

In Community Grammar School, Elewura the FGD discussants were selected from J.S.S.2 class.

In Apata Community Grammar School the FGD discussants were selected from J.S.S.3 class

UNIVERSITY OF IBADAN

Table 3.1. Names of schools selected from each ward and the total number of female students in each school.

WARD	Name of schools selected from each ward	Arms of schools selected from each school (J.S.S.1- J.S.S.3)	Total number of junior female students
8	Oke-Bola Comprehensive High School.	Junior school II	319
9	People's Girls Grammar School	Junior school 1	800
10	Oke-Ado High School	Junior school 1	225
11	Community Grammar School, Elewura	Junior school 1	305
12	Apata Community Grammar School.	Junior school II	342
			Total = 1991

Table 3.2. Proportionate sampling of number of students from selected schools.

Name of school	Number of students that were selected from each school using proportionate sampling method	Number of students that were selected in each school.
Oke-Bola Comprehensive High School.	$\frac{319 \times 420}{1991} = 68$	68
People's Girls Grammar School	$\frac{800 \times 420}{1991} = 169$	169
Oke-Ado High School	$\frac{225 \times 420}{1991} = 47$	47
Community Grammar School, Elewura	$\frac{305 \times 420}{1991} = 64$	64
Apata Community Grammar School.	$\frac{342 \times 420}{1991} = 72$	72
		Total= 420

3.9 Pre-test of the research instruments

The pre-test of the instruments was done in Ibadan North LGA. Two (2) schools; Ikolaba High School, Junior School II,(mixed school) and St. Louis Grammar School, Junior School I (girls only school) were selected. The questionnaire was administered to 50 students which were randomly selected from both schools and two (2) Focus Group Discussions were conducted in both schools. Findings from the pre-test was used to identify some questions that were ambiguous and some open-ended questions that the respondents could not fill appropriately. The ambiguous questions were written in simple terms and the open-ended questions were structured and coded appropriately (see the details in appendix IV). These changes were effected in the questionnaire used for the main data collection.

3.10 Data collection

Instruments for data collection were:

- (a) Focus group discussion guide.
- (b) Questionnaire.

3.10.1 Focus Group Discussion

The FGD was conducted among female adolescents between the ages of 10-14 years in junior secondary 1 to junior secondary 3. Six FGDs (2 each for J.S.S.1, J.S.S.2 and J.S.S.3) was conducted in the five selected schools.

The key issues that were explored in the FGD are the knowledge of puberty, the sources of information of puberty, the experiences of puberty and health seeking behaviour (see appendix I). The questions were open ended to encourage full discussion and were asked in simple language for better understanding. The information obtained from the FGD were used to complement the information obtained from questionnaire. The FGDs were facilitated by the FGD guide.

3.10.2 Questionnaire

A semi-structured questionnaire was developed and used for data collection. There are four (4) sections in the questionnaire with a total of sixty (60) questions (see appendix II). The sections (A,B,C and D) of the questionnaire collected information on the socio-demographic

characteristics, knowledge of puberty, sources of information of puberty, experiences of puberty as well as health-seeking behaviour of the female adolescents in junior secondary schools respectively. The questionnaire measured eight (8) knowledge questions of puberty on a 16-point scale (each question having 2 marks) and knowledge scores of 0-7, $>7 < 12$ and ≥ 12 were rated as poor, fair and good respectively.

3.11 Validity and reliability of instrument

Validity

Several steps were taken to ensure the validity of the instrument. Firstly, relevant literatures and previous research works were consulted in developing the questionnaire. Secondly, the FGD guide and the questionnaire were written in simple language to ensure comprehension by the students. Finally, the instruments were reviewed several times by the supervisor who had a wealth of experience on this field.

Reliability

The questionnaire was pretested among 10% equivalent of the study population in Ibadan North Local Government Area to identify any ambiguous question and other potential problems with it. Test-retest reliability was used to measure the stability of the questionnaire and a coefficient of stability of 0.9 was obtained, which shows that the instrument was very reliable. Cronbach's Alpha model technique was also used to measure the internal consistency of the questionnaire. A reliability coefficient of 0.7 was obtained, higher than the average correlation coefficient of 0.5 thus showing that the instrument was very reliable.

3.12 Data collection process

The collation of data was done in July, 2012 by the researcher with the assistance of the teachers in the various schools in which the data were collated. The researcher used two (2) weeks to administer 420 copies of the questionnaire and to conduct 6 FGDs in the various schools. The questionnaire was self-administered since the research participants could read and write in English language and the questions were written in simple terms, although those that needed help in answering the questions were assisted by the researcher and the teachers. The FGDs were conducted in a quiet place within the various school premises.

The researcher did not encounter any opposition by the school authority, teachers or students of any selected school and also was able to mobilise the research participants easily because the data was collated during the examination period and the students were all on ground. However, the researcher was under the pressure of collating data from the 5 selected schools before the students vacates for the term.

3.13 Data management and analysis

The completed copies of the questionnaire were numbered serially for control and recall purposes and kept safe from unauthorized persons. It was checked for completeness and accuracy on a daily basis. It was also sorted, cleaned, and coded manually by the researcher using a coding guide. The data were analysed using Statistical Package for Social Sciences (SPSS Version 16.0) software. Descriptive (frequency distribution, percentages) and inferential statistics (Chi-square test and logistic regression) were used for the analysis. The socio-demographic characteristics and the sources of information of puberty were analysed using frequency distributions and percentages, the knowledge of puberty were analysed using frequency distributions, percentages, Chi-square test and logistic regression and the experiences of puberty were analysed using frequency distributions, percentages and Chi-square test. In addition, the hypotheses were tested to establish different level of significant relationships between variables. Chi-square test was used to elicit the probabilities and chances of occurrence in differences in the variables.

Results were discussed, presented in frequency tables, charts and figures. The FGD data were translated verbatim and analysed using the thematic approach.

3.14 Ethical consideration

This study followed the ethical principles guiding the use of human participants in research. Ethical approval for the conduct of the study was obtained from the Oyo State Ministry of Health Ethics Review Committee, before commencement (see appendix VII).

Permission was obtained from the authorities of the five (5) schools from which students participated in the study. Assent was obtained from the students and informed consent was obtained from the parents of the students that participated in the study. Participation of the students was voluntary and those who decided to withdraw during the study were permitted to

do so. The data were collected in their various schools and at a time that will not absent them from learning in class.

No identifier such as name of respondents was required and all information provided was kept confidential.

Completed copies of the questionnaire were kept in secured setting where no other persons could have access to the information obtained from respondents. All information were used for the purpose of the research only.

UNIVERSITY OF IBADAN

CHAPTER FOUR

ANALYSIS AND PRESENTATION OF RESULTS

The findings of this study are presented in this chapter. They are organized into the following sections: Respondents' socio-demographic characteristics, knowledge of puberty, sources of information of puberty, experience of puberty and experience of menstruation. Also the responses from six focus group discussions conducted among female adolescents between the ages of 10-14 in J.S.S.1, J.S.S.2 and J.S.S.3 are included.

4.1 Respondents' socio-demographic characteristics

The age of the respondents ranged from 10-14 years with a mean age of 13.0 ± 0.9 years. Christianity (56.7%) topped the list of the religions practiced by the respondents and 89.3% were Yorubas (Details in table 4.1 below). The occupation of the fathers of the respondents were traders (47.6%), artisans (21.7%), civil servants (19.3%), professionals (8.8%), those not working (2.6%) while the occupation of the respondents' mothers were traders (71.2%), artisans (14.0%), civil servants (12.4%), professionals (1.2%) and those not working (1.2%). Secondary school education (36.2%) topped the list for the highest educational level of the fathers of the respondents followed by university education (29.8%), polytechnic/ college of education (21.9%), primary education (7.6%) and non formal education (4.5%). A similar pattern was found in the educational status of respondents' mothers where secondary school education (41.2%) topped the list followed by university education (24.0%), polytechnic/ college of education (19.5%), primary education (11.7%) and non formal education (3.6%).

Table 4.1. Respondents' socio-demographic characteristics. (N = 420)

	Number of students	Percentage (%)
Age of respondents		
10 years	8	1.9
11 years	17	4.0
12 years	92	21.9
13 years	152	36.2
14 years	151	36.0
Class of respondents		
J.S.S.1	108	25.7
J.S.S.2	158	37.6
J.S.S.3	154	36.7
Religion of respondents		
Christianity	238	56.7
Islam	179	42.6
Traditional	3	0.7
Ethnic group of respondents		
Yoruba	375	89.3
Igbo	28	6.7
Hausa	13	3.1
Others*	4	0.9

*Others {(Binis=2(0.5%), Ibibio=1(0.2%), Ebiraland=1(0.2%)}

4.2 Knowledge of puberty

Seventy eight percent of the respondents defined puberty as the physical and emotional changes that occur in adolescents and 57.4% of the respondents defined menarche as the first flow of menstrual blood among girls during puberty. Half of the respondents were able to list the changes that take place in girls during puberty (details in table 4.2 below). From their responses, the flow of blood during menstruation lasts for 3-7 days (73.8%), 1 month (12.6%), 3 weeks (9.5%) and 1 day (4.0%). However, 46.0% of the respondents said that the blood that flows during menstruation flows from the blood vessels, uterus (33.8%), bladder (15.2%), capillaries (5.0%) and the range in which menstrual cycle takes place is between 8-10 days (50.5%), 26-35 days (30.2%), 40-60 days (12.9%) and 30-45 days (6.4%).

The responses from the discussants showed that most of them had a poor knowledge of puberty and this is in consonance with the findings from the questionnaire.

Majority of the discussants in (J.S.S.2 and J.S.S.3) gave the following definition of puberty:

Puberty is the short span of life which mark the beginning of sexual maturity. Some of their responses on the physical changes that occur during puberty in girls are: hair appears in the armpit and pubic regions, onset of menstruation, breast development, pimples appears on the face. When they were asked to define menstruation, majority of them defined it as the monthly flow of blood from the womb through the vagina in every woman of child bearing age. With regards to where the menstrual blood flows from, the responses from most of them is from the womb through the vagina. Some other responses were from the private part of the girl; from the fallopian tube.

In the above responses given by the discussants, it is pertinent to note that the discussants in J.S.S.1 could not give any information with regards to the above information in the two Focus Group Discussion conducted among them. This is in consonance with the finding that there is a significant relationship between class and the knowledge of puberty, as the knowledge of puberty increases with class.

However all the discussants do not know the emotional changes that occur during puberty in girls, definition of an adolescent, age range for adolescence, growth spurt, the age range in which puberty occurs for the female adolescents and the length of days it takes to complete a menstrual cycle.

Table 4.2. Knowledge of puberty among respondents (N=420)

	Number of students	Percentage (%)
Definition of puberty		
Physical and emotional changes that occurs in adolescents*	329	78.3
Transition from childhood to adulthood	43	10.2
Changes that occur in the blood	33	7.9
None of the above	15	3.6
Definition of menarche		
The first flow of menstrual blood among girls during puberty*	241	57.4
Growth of breasts	90	21.4
Deepening of the voice	62	14.8
Growth of pubic hairs	27	6.4
Changes that takes place during puberty		
Breast development+ Hair grows in pubic region and armpit + Onset of menstruation + Increase in weight and height + Enlargement of hips*	213	50.7
Breast development + Onset of menstruation	68	16.2
Breast development+ Hair grows in pubic region and armpit + Onset of menstruation	67	16.0
Breast development only	41	9.8
Onset of menstruation only	24	5.7
Eyes get brighter+ Head is enlarged.	7	1.7

*Correct answers

The mean knowledge score on a 16 point scale was 10.1 ± 3.1 . Breakdown of results showed that 57.1% of the respondents had a fair knowledge, 23.1% had a poor knowledge and 19.8% had a good knowledge of puberty.

The knowledge grade of respondents were compared with respondents' age, class, religion, ethnic group, father's occupation, mother's occupation, father's highest educational level and mother's highest educational level. The knowledge of the respondents was found to increase by age and class showing that there is an association between the age and class of the respondents and the knowledge of puberty (Details in table 4.4 below).

With regards to father's highest educational level of the respondents, more (38.1%) of the respondents whose fathers had a university education had good knowledge of puberty when compared with those whose fathers' highest educational level is polytechnic/college of education (29.9%), secondary education (27.8%), primary education (3.1%) and non formal education (1.0%).

There is a strong association between the mother's educational level and the knowledge of puberty. The respondents whose mother had a secondary education had the highest proportion (37.1%) of a good knowledge of puberty, followed by those whose mothers' highest educational level is polytechnic/ college of education (29.9%), university education (26.8%), primary education (6.2%) and non formal education (0.0%).

However, no association relationship was found between the respondents' religion, ethnic group, father's occupation, mother's occupation, and knowledge of puberty (Details in table 4.5 below).

Table 4.3. Percentage of respondents' knowledge grade

Knowledge Grade	Number of students	Percentage (%)
Good (13-16)	83	19.8
Fair (8-12)	240	57.1
Poor (0-7)	97	23.1
Total	420	100.0

UNIVERSITY OF IBADAN

Table 4.4. Relationship between respondents' age, class, father's highest educational level, mother's educational level and knowledge of puberty.

Age (years)	Knowledge category of respondents			Total N(%)	X ²	P value	Df
	Good N(%)	Fair N(%)	Poor N(%)				
10	1(1.0)	2(0.8)	5(6.0)	8 (1.96)	28.8	0.00	8
11	3(3.1)	6 (2.5)	8 (9.6)	17 (4.0)			
12	12(12.4)	56 (23.3)	24 (28.9)	92 (21.9)			
13	39(40.2)	91 (37.9)	22 (26.5)	152(36.2)			
14	42(43.3)	85 (35.4)	24 (28.9)	151(36.0)			
Class							
J.S.S.1	3 (3.1)	61 (25.4)	44 (53.0)	108(25.7)	97.8	0.00	4
J.S.S.2	25 (25.8)	102(42.5)	31 (37.3)	158(37.6)			
J.S.S.3	69 (71.1)	177(32.1)	8 (9.6)	154(36.7)			
Father's highest educational level							
Non-formal education	1(1.0)	13 (5.4)	5(6.0)	19(4.5)	24.5	0.00	8
Primary	3(3.1)	16 (6.7)	13(15.7)	32 (7.6)			
Secondary	27 (27.8)	87 (36.2)	38 (45.8)	152(36.2)			
Polytechnic/ College of Education	29 (29.9)	51 (21.2)	12 (14.5)	92 (21.9)			
University	37 (38.1)	73 (30.4)	15 (18.1)	125(29.8)			
Mother's highest educational level							
Non-formal education	0(0.0)	13 (5.4)	2 (2.4)	15 (3.6)	42.9	0.00	8
Primary	6 (6.2)	20 (8.3)	23 (27.7)	49 (11.7)			
Secondary	36 (37.1)	100(41.7)	37 (44.6)	173(41.2)			
Polytechnic/ College of Education	29 (29.9)	43 (17.9)	10 (12.0)	82 (19.5)			
University	26 (26.8)	64 (26.7)	11 (13.3)	101(24.0)			

Table 4.5. Relationship between respondents' religion, ethnic group, father's occupation, mother's occupation and knowledge of puberty.

Religion	Knowledge category of respondents			Total N(%)	X ²	P value	Df
	Good N(%)	Fair N(%)	poor N(%)				
Christianity	63(64.9)	131(54.6)	44(53.0)	238(56.7)	4.6	0.33	4
Islam	33(34.0)	107(44.6)	39 (47.0)	179(42.6)			
Traditional	1(1.0)	2(0.8)	*	3 (0.7)			
Ethnic group							
Yoruba	85(87.6)	216(90.0)	74 (89.2)	375(89.3)	10.31	0.41	10
Hausa	1(1.0)	8 (3.3)	4(4.8)	13 (3.1)			
Igbo	10(10.3)	14 (5.8)	4(4.8)	28 (6.1)			
Benin	*	1 (0.4)	1(1.2)	2(0.5)			
Ibibio	1(1.0)	*	*	1(0.2)			
Ibira	*	1 (0.4)	*	1(0.2)			
Father's occupation							
Civil servant	18 (18.6)	53(22.1)	10(12.0)	81(19.3)	8.90	0.35	8
Trader	47(48.5)	107(44.6)	46(55.4)	200(47.6)			
Artisan	19(19.6)	55(22.9)	17(20.5)	91(21.7)			
Professional	12(12.4)	17(7.1)	8(9.6)	37(8.8)			
Not working	1(1.0)	8(3.3)	2(2.4)	11(2.6)			
Mother's occupation							
Civil servant	13(13.4)	31(12.9)	8(9.6)	52(12.4)	5.97	0.65	8
Trader	72(74.2)	168(70.0)	59(71.1)	299(71.2)			
Artisan	10(10.3)	34(14.2)	15(18.1)	59(14.0)			
Professional	2(2.1)	3(1.2)	*	5(1.2)			
Not working	1(1.0)	4(1.7)	1(1.2)	5(1.2)			

*0.00

The knowledge scores was graded as 0-7 and 8-16 as poor and good knowledge respectively and a logistic regression analysis was done to confirm the level of significance of the relationship between respondents' age, class, father's educational level, mother's educational level and knowledge of puberty. The relationship between age, father's highest educational level, mother's educational level and knowledge of puberty was not significant (see the details in table 4.6). Only the relationship between the class and the knowledge of puberty was significant (see the details in table 4.7).

UNIVERSITY OF IBADAN

Table 4.6. Logistic regression analysis of the relationship between age, father’s educational level, mother’s educational level and knowledge of puberty.

	Odds ratio	95% C.I
Age		
14 (Reference)		
13	2.0	0.2-1.4
12	0.1	0.0-1.6
11	0.6	0.2-1.5
10	0.6	0.3-1.2
Father’s highest educational level		
University (Reference)		
Polytechnic/ College of Education	0.3	0.3-1.9
Secondary	0.4	0.1-1.6
Primary	0.8	0.4-1.8
Non-formal education	0.5	0.2-1.0
Mother’s highest educational level		
University (Reference)		
Polytechnic/ College of Education	2.9	0.4-2.9
Secondary	0.6	0.2-2.0
Primary	0.7	0.3-1.5
Non-formal education	1.3	0.5-3.1

Table 4.7. Logistic regression analysis of the relationship between class and the knowledge of puberty

Class	Odds ratio	95% C.I
J.S.S.3 (Reference)		
J.S.S.2	0.1	0.1-0.3
J.S.S.1	0.3	0.2-0.5

UNIVERSITY OF IBADAN

4.3 Sources of information of puberty

Most (82.1%) of the respondents have received an information of puberty and their school teachers (65.5%) topped the list of the sources of information of puberty. On preferred source for information of puberty, mothers (42.4%) topped the list .However, 65.0% of the respondents have not heard about growth spurt. Table 4.8 gives the details of the sources of information of puberty and menstruation and table 4.9 gives the details of the preferred sources of information of puberty.

The responses of the discussants from the Focus Group Discussion conducted were in line with the findings from the questionnaire administered. Majority of the discussants mentioned their school teachers as their source of information of puberty followed by parents, friends, elder sisters, cousins, guardians, doctors and would prefer to receive information of puberty from their parents, followed by School teachers, sisters, friends, doctors.

Table 4.8. Respondents' awareness and sources of information of puberty and menstruation

	Number of students	Percentage (%)
Ever received any information of puberty (N= 420)		
Yes	345	82.1
No	75	17.9
Sources of information of puberty (N = 345)		
School teacher	226	65.5
Mother	81	23.5
Books/ magazines	11	3.2
Doctor	9	2.6
Sisters	8	2.3
Friends	7	2.0
Internet	3	0.9
Ever heard about menstruation (N=420)		
Yes	360	85.7
No	60	14.3
Sources of information of menstruation (N=360)		
School teacher	203	56.4
Mother	97	26.9
Sisters	27	7.5
Friends	13	3.6
Doctor	13	3.6
Books/ magazines	6	1.7
Brothers	1	0.3

Table 4.9. Respondents' preferred sources of information of puberty

Preferred sources	Number of students	Percentage (%)
Mother	178	42.4
School teacher	170	40.5
Doctor	27	6.4
Sisters	21	5.0
Books/ magazines	14	3.3
Films/ videos	5	1.2
Friends	3	0.7
Internet	2	0.5
Total	420	100

UNIVERSITY OF IBADAN

4.4 Experiences of puberty.

All (100%) respondents had entered the puberty period with the greater proportion entering it at age 12 (30.5%). Others are age 11(29.3%), age 10 (22.1%), age 13 (8.6%), age 9 (8.3%), age 14 (0.7%) and age 8 (0.2%). The changes that respondents noticed in their bodies are listed in table 4.10 below. Fifty three percent of the respondents experienced these changes in their bodies before their friends and most of them (47.0%) were happy while 28.3% were concerned, 23.9% were shy, 0.5% afraid and 0.3% sad. Among the 46.9% that did not experience these changes in their bodies before their friends, 32.5% of them felt happy, 31.2% felt different, 19.5% felt concerned, 16.5% felt shy and 0.2% felt sad.

Among the 99.0% of the respondents that have started developing breasts, a third (30.0%) started developing breasts at the age of 12, followed by 28.3% at age 11, 22.4% at age 10, 9.5% at age 13, 7.4% at age 9, 1.2% at age 14 and 0.5% at age 8 and 49.6% were happy with the development in their body. Ninety percent of the respondents have started growing hair in the armpit and pubic region and 40.5% felt concerned about it. Also 74.0% of the respondents have noticed an increase in their body weight and height while 43.7% also felt concerned about it. Furthermore, 39.5% have pimples on their faces and only 24.5% have a sexual feeling for the opposite sex.

Table 4.10. Changes experienced by the respondents during puberty (N=420)

	Number of students	Percentage (%)
Changes that were noticed in the body		
Breast development + Menstruation onset + Hair growth in the armpit and pubic regions	145	34.5
Breast development + Menstruation onset + Hair growth in the armpit and pubic region + Pimples on the face	137	32.6
Breast development + Hair growth in the armpit and pubic regions	104	24.8
Breast development only	28	6.7
Hair growth in the armpit and pubic region only	3	0.7
Menstruation onset only	2	0.5
Pimples on the face only	1	0.2

4.5 Experience of menstruation

Most (67.4%) of the respondents have started menstruating and age 12 (28.6%) was reported more than other ages as the age of menarche by the respondents (see figure 4.1 below). Almost 44.0% of the respondents were surprised when they first saw their menstruation while others were afraid (26.7%), happy (20.7%), angry (6.3%) and embarrassed (2.5%). Fifty eight percent of the respondents were living with their parents when they saw their first menstruation and 74.6% discussed the experience with someone. Mother (63.8%) had the highest frequency as the person the respondents discussed the experience with. Few (25.4%) of the respondents did not discuss the experience and the reason most reported by them for not discussing the experience was that they were shy and afraid (31.0%), 18.3% felt that is normal and 12.7% reported that they have the information about it already. Eighty three percent of the respondents see their menstruation every month and 3-5 days was reported 73.1% as the length of days their period lasts.

Over half (84.5%) of the respondents experience menstrual problem with headache and stomach pain topping the list (47.9%) of problems experienced by them. Other forms of problems experienced are listed in table 4.11. Only 38.5% of those with menstrual problem sought medical help. Sources of help were hospital (42.9%), patent medicine vendor (38.5%) and pharmacy (17.0%). Drugs (79.1%) was reported more as the medication received by the respondents than other forms of medication. Reasons given for not seeking medical help among 61.5% who did not seek medical help are: can take care of self (31.3%), do not have money (28.7%), feel that it is normal (27.3%), and not having time (12.0%). Even though this group did not seek medical help outside their homes, they engaged in activities to relieve themselves of the problem. These activities include: relaxation (30.4%), taking salt and water solution (22.1%), placing a bottle of warm water below the abdomen (12.9%), taking herbs (12.4%), taking water only (8.8%), exercise (8.3%), and drinking *garri* with salt (5.1%).

Seventy seven percent of the respondents avoid some activities when they are menstruating and physical exercise (38.0%) was reported more as the activity most avoided. Other activities avoided by the respondents are listed in table 4. 8. Also, 77.4% of the respondents use

sanitary pad during their menstruation while others use pieces of cloth (15.9%), toilet paper (5.7%), and tampon (1.1%).

The responses gotten from the FGD, were also in line with the findings from the questionnaire administered. With regards to the experience of the discussants when they saw their first menstruation, some of them shared the following experiences:

“I was surprised; I was shocked; I was afraid and shy”

“The first day I saw my period, I was surprised and afraid but my mother has already told me about menstruation. So I ran inside, fell on the floor and shouted mummy, I am having pains in my private part, blood is coming out! My mother then said to me that it is what she told me about, my period has started and I am now a woman”

“When I saw my first period, I was afraid. I felt that I sat on a nail. So I told my mother and she said that I did not sit on a nail but my period has started”

With regards to the feelings when the breasts start developing, some of the respondents said the following: *“When my breasts started developing I felt something like a nut on my chest. It was small and pained me until it bulged out, enlarged and became breasts”*

“The person’s breast will be painful her; They feel conscious of their body and they will be attracted to the opposite sex”

According to the discussants, the problems experienced during menstruation are *stomach pain, fever, headache, vomiting*. Only few of the discussants said they seek medical help from *chemists, hospitals and pharmacies* and the medication received are mainly *drugs* and sometimes *injections*.

Majority of the discussants do not seek medical help for menstrual problems experienced and some of their reasons for not seeking help included:

Lack of money; lack of time; going to the doctor or to the pharmacy will make people know that you are menstruating; going to a doctor that is not experienced will make you take the wrong drugs because they can ask you to use the drugs you are not supposed to use;

Menstrual problems are part of life. One will have to experience it and don't have to do anything about it; Menstrual problems are common, if one should take paracetamol, she will be okay.

However the discussants mentioned other things they do to relieve menstrual problems. Some of their responses were:

By drinking hot tea; by drinking hot water; by taking " agbo "; by not stressing oneself; by placing a bottle of hot water below the abdomen; by exercising like jumping, running

The discussants said they avoid some activities during menstruation. Some of their responses are listed below:

"As for me, I avoid going to some places like the mosque. The Koran said once you are not in cleanliness, you must not worship or go to the prayer house"

"Some Christians don't like anybody menstruating to come to church"

"I stop fasting and praying when I am menstruating"

"During menstruation, I don't take any sugary thing so that it will not affect me"

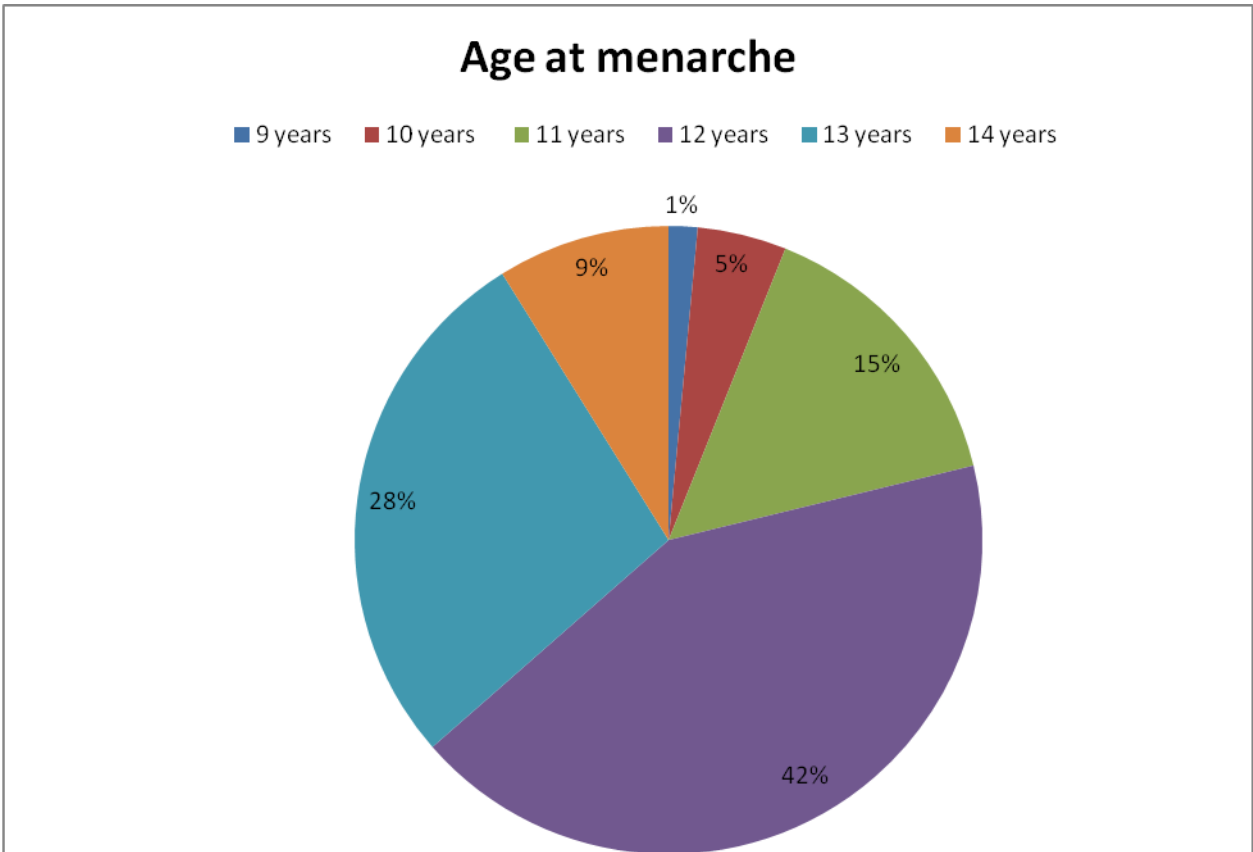


Fig. 4.1: Respondents' age at menarche

UNIVERSITY

Table 4.11. Respondents' experience of menstruation problem and activities avoided during menstruation

	Number of students	Percentage (%)
Do you experience any menstrual problem		
(N=285)		
Yes	240	84.5
No	45	15.5
The menstrual problem experienced (N=240)		
Headache + Stomach pain	115	47.9
Weakness + Stomach pain	77	32.1
Headache only	24	10.0
Headache + weakness	12	5.0
Headache + Stomach pain + Vomiting	12	5.0
Activities avoided during menstruation		
(N=221)		
Physical exercise	84	38.0
Going to school	46	20.8
Going to School + Going to Church/ Mosque + Physical exercise	27	12.2
Going to Church/ Mosque	25	11.3
Going to school + Going to Church / Mosque	22	10.0
Going to School + Physical exercise	13	5.9
Playing with boys	3	1.4
house work	1	0.5

4.6 Hypotheses testing

Hypothesis 1

H₁: There is an association between the age of the respondents and their knowledge of puberty.

H₀: There is no association between the age of the respondents and their knowledge of puberty.

Table 4.12. Hypothesis 1

Age (years)	Knowledge of puberty			Total
	Good N(%)	Fair N(%)	Poor N(%)	
10	1(1.0)	2(0.8)	5(6.0)	8 (1.96)
11	3(3.1)	6 (2.5)	8 (9.6)	17 (4.0)
12	12(12.4)	56 (23.3)	24 (28.9)	92 (21.9)
13	39(40.2)	91 (37.9)	22 (26.5)	152(36.2)
14	42(43.3)	85 (35.4)	24 (28.9)	151(36.0)

$X^2=28.8$, $df= 8$, $p=0.00$

The result showed a significant association between the age of the respondents and their knowledge of puberty ($p<0.05$). Knowledge of puberty among the respondents increased with age. The null hypothesis was therefore rejected and the alternative hypothesis was not rejected.

Hypothesis 2

H₁: There is an association between the age of the respondents and their preferred sources of information of puberty.

H₀: There is no association between the age of the respondents and their preferred sources of information of puberty.

Table 4.13. Hypothesis 2

Age (Years)	Preferred source of information of puberty								Total N(%)
	Mother N(%)	School teacher N(%)	Friends N(%)	Sisters N(%)	Doctor N(%)	Internet N(%)	Books/ Magazine s N(%)	Films/ Videos N(%)	
10	6(3.4)	1 (0.6)	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)	1 (7.1)	0 (0.0)	8 (1.9)
11	10 (5.6)	2 (1.2)	1 (33.3)	2 (9.5)	0 (0.0)	0 (0.0)	1 (7.1)	1 (20.0)	17 (4.0)
12	50 (28.1)	30 (17.6)	0 (0.0)	3(14.3)	3(11.1)	0 (0.0)	2 (14.3)	2 (40.0)	92(21.9)
13	51 (28.7)	70 (46.1)	2 (66.7)	10(47.6)	12 (44.4)	2 (100.0)	5 (35.7)	2 (40.0)	152(36.2)
14	61 (34.3)	67 (39.4)	0 (0.0)	6 (28.6)	12 (44.4)	0 (0.0)	5 (35.7)	0 (0.0)	151(36.0)
Total	178(42.4)	170(40.5)	3 (0.7)	21 (5.0)	27 (6.4)	0 (0.0)	14 (3.3)	5 (1.2)	420 (100)

X²= 49.5, df= 28, p=0.007

*= 0(0.0%)

There was a significant relationship between the age of the respondents and their preferred sources of information of puberty (p<0.05). The null hypothesis was therefore rejected and the alternative hypothesis was not rejected.

Hypothesis 3

H₁: There is an association between the age of the respondents and their experience of menstrual problem.

H₀: There is no association between the age of the respondents and their experience of menstrual problem.

Table 4.14. Hypothesis 3

Age (Years)	Do you experience any menstrual problem	
	Yes N(%)	No N(%)
10	2 (0.8)	0 (0.0)
11	4 (1.7)	4 (9.1)
12	39 (16.2)	8 (18.2)
13	81 (33.8)	18 (40.9)
14	114 (47.5)	14 (31.8)
Total (N=284)	240(57.1)	44 (10.5)

$X^2 = 50.4, p=0.00, df=8$

The result showed a significant association between the age of the respondents and their experience of menstrual problem ($p < 0.05$). The null hypothesis was therefore rejected and the alternative hypothesis was not rejected.

Hypothesis 4

H₁: There is an association between the age of the respondents and their health-seeking behaviour.

H₀: There is no association between the age of the respondents and their health-seeking behaviour.

Table 4.15. Hypothesis 4

Age (years)	Do you seek any medical help when you encounter any menstrual problem	
	Yes N(%)	No N (%)
10	1 (1.1)	1 (0.7)
11	1 (1.1)	3 (2.0)
12	14 (15.2)	26 (17.7)
13	31 (33.7)	48 (32.7)
14	45 (48.9)	69 (46.9)
Total (N=239)	92 (21.9)	147 (35.0)

$\chi^2 = 41.0, p=0.00, df=8$

The result showed a significant association between the age of the respondents and their health-seeking behaviour ($p < 0.05$). The hypothesis was therefore rejected and the alternative hypothesis was not rejected.

Hypothesis 5

H₁: There is an association between the educational level of respondents' father and their health-seeking behaviour.

H₀: There is no association between the educational level of respondents' father and their health-seeking behaviour.

Table 4.16.1. Hypothesis 5

		Do you seek any medical help when you encounter any menstrual problem			
Father's highest educational level.		Yes N(%)	No N(%)	N/A N(%)	Total N(%)
Non formal education		4 (4.3)	8 (5.4)	7 (3.9)	19 (4.5)
Primary		5 (5.4)	15 (10.2)	12 (6.6)	32 (7.6)
Secondary		35 (38.0)	58 (39.5)	59 (32.6)	152 (36.2)
Polytechnic/College of Education.		16 (17.4)	34 (23.1)	42 (23.2)	92 (21.9)
University		32 (34.8)	32 (21.8)	61 (33.7)	125 (29.8)
Total		92 (21.9)	147 (35.0)	181 (43.1)	420 (100)

$X^2 = 9.6$, $df = 8$, $p = 0.29$

There was no association between the educational level of father and the health-seeking behaviour of the respondents ($p > 0.05$). The alternative hypothesis was rejected and the null hypothesis was not rejected.

Hypothesis 5

H₁: There is an association between the educational level of respondents' mother and their health-seeking behaviour.

H₀: There is no association between the educational level of respondents' mother and their health-seeking behaviour.

Table 4.16.2: Hypothesis 5

Mother's highest educational level.	Do you seek any medical help when you encounter any menstrual problem			Total N(%)
	Yes N(%)	No N(%)	N/A N(%)	
Non formal education	5 (5.4)	5 (3.4)	5 (2.8)	15 (3.6)
Primary	7 (7.0)	21 (14.3)	21 (11.6)	49 (11.7)
Secondary	35 (38.0)	68 (46.3)	70 (38.7)	173 (41.2)
Polytechnic/College of Education.	21 (22.8)	24 (16.3)	37 (20.4)	82 (19.5)
University	24 (26.1)	29 (19.7)	48 (26.5)	101 (24.0)
Total	92 (21.9)	147 (35.0)	181 (43.1)	420 (100)

$\chi^2=7.9$, df= 8, p= 0.43

There was no association between the educational level of mother and the health-seeking behaviour of the respondents (p>0.05). The alternative hypothesis was rejected and the null hypothesis was not rejected.

Hypothesis 6

H₁: There is an association between the level of knowledge of puberty of the respondents and their experience of menarche.

H₀: There is no association between the level of knowledge of puberty of the respondents and their experience of menarche.

Table 4.17. Hypothesis 6

Knowledge	How did you feel when you saw your first menstruation					Total N
	Happy N(%)	Angry N(%)	Surprised N(%)	Afraid N(%)	Embarrassed N(%)	
Poor	12 (20.3)	1 (5.6)	25 (20.0)	12 (15.8)	1(4.3)	51
Fair	33(55.9)	13 (72.2)	62 (49.6)	45 (59.2)	3 (1.2)	156
Good	14 (23.7)	4 (22.2)	38 (30.4)	19 (25.0)	3 (42.9)	78
Total	59	18	125	76	7	285

$X^2 = 15.5$, $df = 10$, $p = 0.11$

There was no association between the level of knowledge of puberty of the respondents and their experience of menarche ($p > 0.05$). The alternative hypothesis was rejected and the null hypothesis was not rejected.

CHAPTER FIVE

DISCUSSION, CONCLUSION AND RECOMMENDATIONS

5.1 Discussion

Knowledge of puberty

The class of the respondents was an important factor in determining the level of knowledge of puberty. From the study, it was observed that the respondents in J.S.S 3 had a good knowledge compared to the respondents in J.S.S 2 and J.S.S 1, implying that the knowledge of the respondents of puberty increased with class. This could also be attributed to the fact that most of the respondents in J.S.S 3 are older in age compared to those in J.S.S 2 and J.S.S 1 and those who are older are more likely to have experienced puberty which can lead to increase in their knowledge.

Sources of information of puberty

Findings of this study showed that most of the respondents had heard about puberty and the school teacher were the major source of awareness. This could be attributed to the fact that most parents shy away from discussing reproductive health issues with their children and since sexuality education is incorporated into the school curriculum, they will get the information when it is taught in the classroom by their teachers. This is consistent with the findings of a study carried out among adolescents in China where school teachers were the major source of information of puberty (Liying *et al*, 2007) but inconsistent with the findings of Sathar *et al*, 2001 which showed that girls were most likely to hear about puberty from their mothers, sisters and friends. A very low percentage of mothers were the source of information of menstruation and puberty respectively. This shows poor mother-daughter communication on issues relating to puberty and other reproductive health topics.

Respondents in this study mentioned their mothers as the source from whom they would prefer to receive information of puberty. This is consistent with the findings of a study among female adolescents in Klang Valley, where the mothers were mentioned as the most preferred

source of information of puberty (Kamrani *et al*, 2011). This suggests the need for mothers to be more involved in giving puberty education to their children.

Apart from mothers, teachers were also mentioned as the second source they would prefer to get information of puberty. This is related to the findings of a study conducted among female adolescents in Karachi, Pakistan where school health programmes was cited as the source which could be used to provide information to the adolescents. Eighty percent of the respondents suggested that topics related to puberty, sexual and reproductive health should be taught as a part of the school curriculum (Tazeen *et al*, 2004). This also suggests the need for teachers to be trained in skills to communicate reproductive health education in a youth-friendly approach.

Experience of puberty and menstruation

All the respondents had experienced at least one of the changes that occur during puberty. This is because their ages (10-14) were within the age range for puberty.

Findings of the study showed that a good number of the respondents have started menstruating and the mean age of menarche is 9.18 ± 4.3 (range: between 8 to 14 years) and age 12 was reported more than other ages as the age of menarche. This is inconsistent with the findings of the study conducted among secondary school Chinese girls in Hong Kong where the mean age at menarche was 12.3 ± 1.1 years (Chan *et al*, 2006) and the study conducted in rural Government Girl's School located in Panchkula district of Haryana where the mean age at menarche of the girls was 13.6 ± 0.83 years (range: between 12 years to 15 years) (Singh *et al*, 1999). This early onset of menarche may be attributed to genetic factors and nutritional factors. According to the report of Society for research in child development, the following stressors can lead to early puberty: negativity and coercion in parent-child relationship, lack of parental support and marital conflict. According to them, children with high body mass index and whose mothers had started puberty earlier are more likely to experience early puberty (Hareyan, 2007).

When they saw their first menstruation, different feelings were expressed; surprise, fear, shock, happiness, anger, embarrassment. The feelings that are expressed during menarche is determined by the level of information one has about menstruation. This is consistent with the findings of Tazeen *et al*, 2004 among female adolescents in Karachi, Pakistan, where the

respondents reported their first menstrual experience as shocking, fearful and stressful because they were not given any information about menstruation before it occurred. This further supports the findings of Kim, 1995 which showed that the experience of menarche can be influenced by various factors such as previous information about menstruation from significant others (e.g mothers, sisters, friends) school education, mass media, the time of menarche and environmental factors.

Findings of the study showed that a good number of the respondents were living with their parents when they saw their first menstruation and their mother was the first person they discussed the experience with, followed by their sisters. This could be attributed to the fact that they were living with their parents and the mothers are the closest person they could discuss such experience with in the home. Among the few that did not discuss the experience, the major reasons given for not discussing the experience was that they were shy and afraid, although few of them claimed they already had the information about it and felt that there was no need to discuss it. This suggests the need for a good relationship between adolescents and their mothers, and significant others which will create enabling environment for them to discuss issues about menstruation.

Most of the respondents experienced menstrual problem and the problems experienced were: headache, stomach pain, weakness, vomiting, and its prevalence increased with age. This is reflected in the findings of Chan *et al*, 2006, where dysmenorrhoea occurred among female adolescents in Hong Kong with the following menstruation related symptoms: headache, abdominal pain, dizziness, anxiety, breast tenderness, change of bowel habit, back pain, abdominal bloating sensation, fatigue, nausea. In a study carried out among female adolescents, abdominal pain was the commonest medical problem encountered by the respondents, although some of them had multiple problems (Echendu and Adinma, 2008).

Health-seeking behaviour

Few of the respondents that experienced menstrual problems sought medical help from the hospital, patent medicine vendors, pharmacy and the medication they received were mainly drugs. This is consistent with the findings of a study among female adolescents in Hong Kong

where only 6.4% sought medical advice from gynaecologists, family doctors, paediatricians and Chinese herbalists. But in contrast with the findings of Echendu and Adinma, 2008 among secondary school girls in South Eastern Nigeria where medical problems were most commonly discussed with the mothers.

Those who did not seek medical help when they experienced menstrual problem gave reasons which included; ability to take care of self, feeling that it is normal to experience menstrual problems, financial constraints and time constraints. This is in line with the findings of Chan *et al*, 2006 on the factors affecting the decision to seek medical help which are: time constraints, cost of the consultation, anxiety about facing embarrassing questioning, worry about physical examination. Even though this group did not seek medical help outside their homes, they engaged in activities to relieve them of the problem. These activities included: relaxing, taking salt and water solution, placing a bottle of warm water below the abdomen, taking herbs (*agbo*), taking hot tea and hot water, taking water only, drinking *garri* with salt, exercise. Some of the methods employed by these adolescents to relieve them of this pain do not have proven efficacy to relieve menstrual pains. This further suggests the need for effective reproductive health education.

Findings from the study and the FGD conducted revealed that most of the respondents avoided some activities when they are menstruating. These activities included: physical exercise, going to church/ mosque, doing house chores, playing with boys and also they avoid taking sugary things while menstruating. This is related to the findings of Chan *et al*, 2006 where some of the respondents reported absenteeism from school because of menstruation related symptoms and the findings of Dasgupta *et al*, 2008 where girls did not attend school, any religious occasion, perform any household work, eat certain foods such as sour foods, banana, radish and palm, did not play, and attend any marriage ceremony during the menstrual period.

This suggests the need to educate the female adolescents so that they will have the right information in order to avoid misconceptions. The issue of not going to the mosque is associated with one of the doctrines of the muslims as one of the FGD discussants said “As for

me, it affects me in not going to some places like the mosque. The Koran said once you are not in cleanliness, you must not worship or go to the prayer house”

From the survey, it was observed that majority of the respondents use sanitary pad during menstruation while others use pieces of cloth, toilet paper and very few use tampon. This is in line with the findings of Moronkola and Uzuegbu, 2006 among female nursing students in Ibadan, Nigeria and Oche *et al*, 2011 among adolescent girls in Sokoto, Nigeria where majority of the respondents use sanitary pad to manage their menstruation but in contrast with the findings of Echendu and Adinma, 2008, among secondary school girls in Southeastern Nigeria and Abioye-Kuteyi, 2000 among secondary school girls in Ile Ife, Osun State Nigeria, where most of the respondents use unsanitary menstrual absorbents during menstruation.

Hypotheses

The result of the hypothesis showed a significant association between the age of the respondents and their knowledge of puberty. Knowledge of puberty among the respondents increased with age. This could be attributed to the fact that those older in age are more likely to have experienced puberty which can lead to increase in their knowledge of puberty.

There was a significant association between the age of the respondents and their experience of menstrual problem. Those who are older experienced menstrual problem compared to those who are younger in age. This is because those who are older would have started menstruating and are likely to experience menstrual problems. This is consistent with a study among female adolescents in Hong Kong where dysmenorrhoea occurred in 68.7% of the girls and its prevalence increased significantly with age (Chan *et al*, 2006). Menstrual problem is a common condition in adolescents. In most cases, it is not as a result of an underlying medical problem but due to the action of a chemical substance called prostaglandin which causes the muscles of the uterus to tighten (Sharma *et al*, 2008).

The result of the hypothesis also showed a significant association between the age of the respondents and their health-seeking behaviour. Those who are older sought medical help more than those who are younger in age. This could be attributed to the fact that those who are older in age would have experienced menstruation and menstrual problem and because of

that seek medical help unlike those who are younger and have not experienced menstruation and will not have any cause to seek medical help because of menstrual related issues.

5.2 Conclusion

The findings of this study show that young adolescents in Ibadan South-West LGA (especially those in J.S.S.1 and J.S.S.2 do not have good knowledge of puberty, their major source of information of puberty is the school teacher and their preferred source of information of puberty is the mother. Most of them have started menstruating and experienced menstrual problems. Majority of those that experienced menstrual problems do not seek medical help but make use of remedies with unproven efficacy to alleviate menstrual problems and also they avoid some activities and items when they are menstruating.

5.3 Recommendations.

- The Ministry of Education in collaboration with the Ministry of Health and other health agencies should train mothers and empower them to become more involved in educating their girl-child of puberty. Mothers have a major influence in their children's lives and therefore young adolescents tend to depend on the information they get from their mothers on reproductive health issues, whether wrong or right. Also they are more likely to respond to reproductive health programmes which have the support from their homes.
- The contents of the reproductive health curriculum should be reviewed to include puberty and menstruation especially among J.S.S.1 and J.S.S.2 and evaluated regularly so that any weakness can be identified and necessary improvements made in order to meet up with the requirements of the adolescents.
- Teachers who give puberty education should be trained and retrained for adequate knowledge and skills for disseminating reproductive health information to adolescents so as to make an effective impact on them.
- Students should be assessed from time to time on reproductive health issues in order to ascertain the level of impact of the information given to them.
- The Ministry of Health and other health agencies should collaborate with the Ministry of Education to provide puberty education materials to students in various schools. The existing materials should be reviewed for accuracy and appropriateness of information.

Attractive IEC materials should be developed and supported with behaviour change communication strategies for a maximum impact and effective puberty education.

- Enabling environment should be created both at home and school so that young adolescents will be able to discuss their reproductive health concerns/ problems without fear and receive the required attention and appropriate solutions.
- School clinics should be put in place in all the schools to take care of the health problems of the students when they are in school. This will help in reducing the rate of absenteeism in schools due to menstrual problems and other health problems adolescents may face.
- Health staff and others working directly with young adolescents should be trained in youth-friendly approaches and counseling skills.

Suggestions for further research

The following recommendations were made for future research:

1. Knowledge, sources of information and experience of puberty among junior secondary school male adolescents.
2. Knowledge, sources of information and experience of puberty among out of school female adolescents.
3. Knowledge, perception of reproductive health education among mothers of adolescents.

Implications for reproductive health education

Reproductive health education is necessary to give young adolescents the right information about reproductive health issues which will equip them to handle effectively the period of adolescence and the challenges that come with it. In order to deliver appropriate and effective puberty health education, based on the findings of this study, there is need for timely and comprehensive puberty education for young adolescents in schools. Education about puberty is usually given in J.S.S.3 class in most schools and the 3rd term of J.S.S.2 in few schools and not given in J.S.S.1. Poor knowledge of puberty can be addressed by giving puberty education in J.S.S.1 in the secondary schools by the school teachers in collaboration with the Ministries of Education, Health, and Youth in their Basic science classes and in the co-curricular activities organized every thursday morning in the various schools. This is because the age of most of the students in J.S.S.1 is within the age range which puberty occur and they need to

be properly informed about puberty at that stage before they experience it. The information provided should not focus only on the physical changes that occur during puberty but also on the social, emotional, cognitive, psychological development and the challenges that come with it and how to handle it so that they will be well informed and also know how to handle the challenges that arise from puberty.

Puberty education can also be integrated in health care delivery for young adolescents in the health sectors. This will serve as an avenue for them to get information on puberty.

UNIVERSITY OF IBADAN

REFERENCES

- Aaron, G. B., Laurie, K. G., Beverly, J. M., Mildred, M. and Nonhlanhla, A. S. 2002. Primary and preferred sources for HIV/AIDS and sexual risk behaviour information among adolescents in Swaziland, Southern Africa. *International Journal of Nursing Studies* 39(5): 525-538.
- Abioye-Kuteyi, E. A. 2000. Menstrual knowledge and practices amongst secondary school girls in Ile Ife, Nigeria. *Perspectives in Public Health*. 120(1):23-26.
- Afsaneh, A., Shokouh, E., Rezvan, P. and Gbolam, H. 2007. Effects of puberty health education on 10-14 years old girl's knowledge, attitude and behaviour. *Iranian Journal of Nursing and Midwifery*.13(1):38.
- Alan, G. 1995. Hopes and Realities: *Closing the gap between women's aspiration and their reproductive experiences*. New York: Alan Guttmacher Institute. Chapter 2: 45
- Anon. 2007. Multiple pregnancy: twins or more - topic overview. *Healthwise*. 24 July 2007. Retrieved Nov. 05 2012, from <http://www.webmd.com/baby/tc/multiple-pregnancy-twins-or-more-topic-overview>.
- Anon. 2013. Puberty, Period and Girls' Bodies. Retrieved April, 06 2013, from [http:// www.avert.org/puberty-girls.htm](http://www.avert.org/puberty-girls.htm).
- Bankole, A., Ahmed, F., Neema, S., Ouedraogo, C. and Sidon, K. 2007. Knowledge of correct condom use and consistency of use among adolescents in four countries in Sub-Saharan. *African Journal of Reproductive Health* 11(3):197-220.
- Bankole, A., Biddlecom, A., Guiella, G., Singh, S. and Zulu, E. 2007. Where do Chinese adolescents obtain knowledge of sex? Implications for sex education in China. *Health Education* 107(4):351 – 363.
- Bankole, A., Biddlecom, A., Guiella, G., Singh, S. and Zulu, E. 2007. Sexual behaviour, knowledge and information sources of very young adolescents in four Sub-Saharan African countries. *Afr J Reprod Health*.11(3):28-43.
- Benhague, S., Christenson, K., Martin, S. and Wysong, M. 2006. Tuko Pamoja: adolescent reproductive health and life skills curriculum. Part 1. Seattle WA: PATH Publications. Retrieved Nov. 12, 2012 from <http://path.org>reproductive health>adolescenthealth>.
- Blanchet, T. 1987. Meanings and rituals of birth in rural Bangladesh. Dhaka, Bangladesh: University Press. Retrieved April 04, 2013, from http://www.eepa.be/wcm/ dm documents/bgpaper_menstrual-hygiene.pdf.

- Bosch, A. and Hutter, I. 2002. Adolescent reproductive health in rural Bangladesh. *Journal of Health*. 31(2):67–94. Retrieved April 04, 2013, from [http:// www.eepa.be/wcm/dmdocuments/bgpaper-_menstrual-hygiene.pdf](http://www.eepa.be/wcm/dmdocuments/bgpaper-_menstrual-hygiene.pdf).
- Bott, S., Jejeebhoy, S., Shah, I. and Puri, C. 2003. Towards Adulthood: *Exploring the Sexual and Reproductive Health of Adolescents in South Asia*. Geneva: World Health Organization. 78-80. Retrieved March 20, 2013, from <http://www.whqlibdc.who.int/./9241562501.pdf>.
- Chan, S., Yiu, K., Yuen, P., Sahota, D. and Chung, T. 2006. Menstrual problems and health-seeking behaviour in Hong Kong Chinese girls. *Hongkong Med J* 2009. 15: 18-23.
- Chang, S. R. and Chen, K. H. 2008. Age at menarche of three-generation families in Taiwan. *Annals of Human Biology* 35(4):394-405.
- Chen, H. M. and Chen, C. H. 2005. Related factors and consequences of menstrual distress in adolescent girls with dysmenorrhoea. *Kaohsiung Journal of Medical Sciences*. 21:121–127.
- Chong, E., Hallman, K. and Brady, M. 2006. Investing when it counts: *Generating the evidence base for policies and programmes for very young adolescents*. Guide and tool kit. New York: Population Council.
- Chumlea, W. E., Schubert, C.M. and Roche, A.F. 2003. Age at menarche and racial comparisons in US girls. *Paediatrics*.111:110– 113.
- Dasgupta, A. and Sarkar, M. 2008. Menstrual Hygiene: How hygienic is the adolescent girl? *Indian J Community Med*. 33(2): 77–80. Retrieved April 06, 2013 from <http://www.ncbi.nlm.nih.gov/pmc/articles/pmc2784630/>.
- Dorn, L. D. 2009. Menstrual symptoms in adolescent girls: association with smoking, depressive symptoms, and anxiety. *Journal of Adolescent Health*. 44:237–243.
- Echendu, D. A. and Adinma, I. J. 2008. Perceptions and Practices on Menstruation amongst Nigerian Secondary School Girls. *African Journal of Reproductive Health* 12(1):74-83.
- El-Gilany, A. H., Badawi, K. and El-Fedawy, S. 2005. Epidemiology of dysmenorrhoea among adolescent students in Mansoura, Egypt. *Eastern Mediterranean Health Journal*. 11:155–163.
- Erin, M. 2007. Adolescent growth and Development Research. 1st ed. Virginia: Virginia Tech. 350-850.

- Esimai, O. A. and Esan, G.O. 2010. Awareness of menstrual abnormality amongst college students in urban area of Ile-Ife, Osun state, Nigeria. *Indian Journal of Community Medicine*. 35:63–66.
- Federal Ministry of Health, 2005. *Adolescent Development*. Adolescent development health training manual. Abuja: Finetex Press. Module 2. 18-35.
- Fernandez, M. 2010. Breaking the Silence: menstrual hygiene management in rural India. *Presentation from the 2010 World Water Week September 5-11 in Stockholm. WaterAid India*. Retrieved April 06, 2013, from http://www.worldwaterweek.org/documents/www_pdf/2010/monday/k11/4_fernandez_breaking_silence.pdf.
- Fikree, F. F., Ali, T., Durocher, J. M. and Rahbar, M. H. 2004. Health service utilization for perceived postpartum morbidity among poor women living in Karachi. *Soc Sci Med* 9:681-94.
- Fox, C. S. 2005. First menstrual cycle linked to BMI. *Times of India*. November 19, 2012. Retrieved March 25, 2013, from <http://www.medicalnewstoday.com/..252826.php>.
- Garg, R., Goyal, S. and Gupta, S. 2011. India moves towards menstrual hygiene: subsidized sanitary napkins for rural adolescent girls-issues and challenges. *Matern Child Health J*. 16(4): 767-74.
- Ge, X. and Conger, R. D. 1996. Coming of age too early: pubertal influences on girl's vulnerability to psychological distress. *Child development*. 67: 3386-3408.
- Gomes, A., Costa, M. C., Sobrinho, C. L., Santos, C. A. and Bacelar, E. B. 2002. Adolescents' knowledge about adolescence, puberty and sexuality. *J Pediatr*. 78(4):301-8.
- Goodwin, J. 2010. Many girls now begin puberty at age 7, 8. *Health News* August 09, 2010. Retrieved March 20, 2013 from <http://www.news.healingwell.com/index.php%3fp%>.
- Graber, J., Lewinsohn, P. M., Seeley, J. R. and Brooks-Gunn, J. 1997. Is psychopathology associated with the timing of pubertal development? *Journal of the American Academy of Child and Adolescent Psychiatry*. 36: 1768-1776.
- Green, L. and Kreuter, M. 1991. Health promotion planning: an educational and environmental approach. 2nd ed. Mountain view, C A: Mayfield publishing company.
- Handelsman, C. D., Carbral, R. J. and Weisfeld, G. E. 1987. Sources of information and adolescent sexual knowledge and behaviour. *Journal of Adolescent Research* 2(4): 455-463.
- Hareyan, A. 2007. Family conditions may affect when girls experience puberty. *Journal of Child Development*. 10(1):43.

- Harlow, S. D. and Campbell, O. M. 2004. Epidemiology of menstrual disorders in developing countries: a systematic review. *British Journal of Obstetrics and Gynaecology*. 111:6–16.
- Harvey, L. J., Armah, C. N. and Dainty, J. R. 2005. Impact of menstrual blood loss and diet on iron deficiency among women in the UK. *British journal of nutrition* 94(4): 557–64. Retrieved Dec. 07, 2012 from http://journals.cambridge.org/abstract_S0007114505002175.
- Havez, H. 2001. Improving Health in Schools. *Iranian Journal of Nursing and Midwifery Research*. 4(10):50-56.
- Healy, D. L. 2004. menorrhagia, heavy periods - current issues. Monash University. ABN. Retrieved Dec. 05, 2012, from <http://www.med.monash.edu.au/ob-gyn/research/menorr.html>.
- Hickey, M. and Balen, A. 2003. Menstrual disorders in adolescence: investigation and management. *Hum Reprod*. 9:493–504.
- Houston, A. M. 2006. Knowledge, attitudes and consequences of menstrual health in urban adolescent females. *Journal of Paediatric and Adolescent Gynaecology*. 19:271–275.
- Hu, L., Gustofson, R, L. and Feng, H. 2008. Converse regulatory functions of estrogen receptor- α and - β subtypes expressed in hypothalamic gonadotropin-releasing hormone neurons. *Mol. Endocrinol*. 22 (10): 2250–2259.
- John, M. G. 2007. `All About menstruation. WebMD. Retrieved Dec. 07, 2012, from <http://www.webmd.com/a-to-z-guides/all-about-menstruation>.
- Jones, C. 2010. Early onset of menstrual cycle. Livestrong foundation. Retrieved Dec. 07, 2012, from <http://www.livestrong.com>LIVESTRONG.COM>menstrual cycle>.
- Juyal, R., Kandpal, S. D., Semwal, J. and Negi, K. S. 2011. Practices of menstrual hygiene among adolescent girls in a district of Uttarakhand. *Indian Journal of Community Health* 24:2. Retrieved April 06, 2013, from <http://www.iapsmupuk.org/journal/index.php/IJCH/view/173>.
- Kamrani, M. A., Sharifah., Z. S., Hamzah, A. and Ahmad, Z. 2011. Sources of information on sexual and reproductive health among secondary school girls in the Klang Valley *Malaysian Journal of Public Health Medicine*. 11(1): 29-35.
- Khan, A. 2000. Adolescents and reproductive health in Pakistan: a literature review. *Population Council Final Report 2000*. Retrieved Dec. 06, 2012 from http://www.popcouncil.org/..rr_11.pdf.

- Kim, J. E. 1995. Analysis of Menarche experience and raising of the need of menarche education. *J Korean Acad Womens Health Nurs.* 1(2):191-208.
- Kippley, J. and Sheila, K. 1996. *The Art of Natural Family Planning.* 4th ed. Cincinnati, OH: The Couple to Couple League. 92-93.
- Ko, P. and Yoon, Y. 2007. Placenta Previa. *Healthwise.* Retrieved Dec. 10, 2012, from <http://www.emedicine.com/emerg/topic427.htm>.
- Krapp, k., Wilson, J. and Cengage, G. 2005. Menstruation. *Gale Encyclopedia of Children's Health.* California: Cengage Gale. Vol.3. Retrieved April 06, 2013, from <http://www.enotes.com/menstruation-reference/>>.
- Kuper, A. 1982. Wives for cattle: bridewealth and marriage in Southern Africa. Retrieved April, 04 2013, from http://www.eepa.be/wcm/dmdocuments/BGPaper_Menstrual-Hygiene.pdf.
- Lark, S. M. 2012. PMS Self-Help Book and Menstrual Cramps. Retrieved Dec. 06, 2012, from <http://fwhc.org/health/moon.htm>.
- Liyang, Z., Xiaoming, L. and Iqbal, H. S. 2007. Where do Chinese adolescents obtain knowledge of sex? Implications for sex education in China. *Health Education* 107 (4): 351 – 363.
- Losos, J. B., Raven, P. H., Johnson, G. B. and Singer, S. R. 2002. *Biology.* 6th edition. New York: McGraw-Hill. 1207–1209.
- Mahon, T. Cavil, S. and House, S. 2012. Menstrual hygiene matters: a free and comprehensive resource for improving menstrual hygiene for women and girls in middle and lower income countries. *A publication in Water and Health Conference, University of North Carolina in Nov.2012.* Retrieved April 06, 2013, from <http://www.wateraid.org/researchandpublications/view-publication?id=02309d73> .
- Majid, S. 1995. Reproductive health awareness in adolescent girls: report of a survey. *J Coll Physicians and Surg.* 5:214.
- Marti-Henneberg, C. and Vizmanos, B. 1997. The duration of puberty in girls is related to the timing of its onset. *J Paediatr.* 131:618– 621.
- McPherson, M. E. and Korfine, L. 2004. Menstruation across time: menarche, menstrual attitudes, experiences and behaviours. *Women's Health Issues.* 14:193–200.
- Mohammed, S. 2004. Addressing gender inequality in adolescent life skills education: Aahung's experience in Pakistan. *Journal Of Pakistan Medical Association.* Retrieved March 07, 2012, from <http://www.iwhc.org/resources/shaziamohamed051002.cfm>.

- Moronkola, O. A. and Uzuegbu, V. U. 2006. Menstruation: symptoms, management and attitude of female nursing students in Ibadan, Nigeria. *African Journal of Reproductive Health*. 10(3): 84-89.
- Mumtaz, K. and Raouf, F. 1996. Woman to woman: transfer of health and reproductive knowledge. 6th ed. Lahore: Shirkat Gah. Retrieved Dec. 12, 2012, from <http://www.worldcat.org/oc/c/841916>.
- Nair, M.K., Leena, M. L., Paul, M. K., Pillai, H.V., Babu, G., Russell, P. S. and Thankachi, Y., 2011. Attitude of parents and teachers towards adolescent reproductive and sexual health education. *Indian J Paediatr*. 79(1):60-63.
- Nelson, L. M. 2009. Menstruation and the menstrual cycle. National Institute of Health and Human Services, USA. Retrieved Sept. 28, 2012, from <http://www.womenshealth.gov/publications/org/>.
- Nielsen, E. 2011. Trends in the age of menarche. *International Journal of Obstetrics and Gynaecology*. 118(13):1646-1652.
- Oche, M. O., Umar, A. S., Gana, G. J. and Ango, J, T. 2011. Menstrual health: the unmet needs of adolescent girls in Sokoto, Nigeria. *Scientific Research and Essays*. 7(3):410-418.
- Omigbodun, O. and Omigbodun, O. 2004. Unmet need for sexuality education among adolescent girls in Southwest Nigeria: a qualitative analysis. *African Journal of Reproductive Health*. 8 (3):27-37.
- Onyeonoro, U. U., Oshi, D. C., Ndimele, E. C., Chuku, N. C., Onyemuchara, I. L., Ezekwere, S. C., Oshi, S. N. and Emelumadu, O. F. 2011. Sources of sex information and its effects on sexual practices among in-school female adolescents in Osisioma Ngwa LGA, South East Nigeria. *J Pediatr Adolesc Gynecol*. 24(5):294-9.
- Patkar, A. 2011. Menstrual hygiene management and human rights: preparatory input on menstrual hygiene management for end group. Retrieved April 06, 2013, from http://www.wssinfo.org/fileadmin/user_upload/resources/MENSTRUAL-HYGIENE-MANAGEMENT-Paper-for-END-group-1-pdf.
- Poureslami, M. and Osati-Ashtiani, F. 2002. Attitudes of female adolescents about dysmenorrhoea and menstrual hygiene in Tehran suburbs. *Journal of Iranian Medicine*. 5:219–224.
- Quazi, Y. 2003. Adolescent Reproductive Health in Pakistan. In: Botts, Jejeebhoy, S, Shah I, Puri, C., (eds) Towards adulthood: exploring the sexual and reproductive health of adolescents in South Asia. Geneva: World Health Organization. 78-80. Retrieved Nov. 13, 2012 from http://www.jpma.org.pk/full_article_text.p.

- Romito, K. and Jones, K. 2010. Premenstrual Syndrome. *Healthwise*. June 27, 2011. Retrieved Dec. 07, 2012, from <http://www.uofmhealth.org/./stp/1749>.
- Sabeeh, Q. and Abbas, J. 2006. Adolescent reproductive and sexual health: *an exploration of trends in Pakistan* PAVHNA, Pakistan. Volume 1. Retrieved March 03, 2013, from <http://www.hivaidsclearinghouse.unesco.org>home>search/./php>.
- Santina, T., Wehbe, N. and Ziade, F. 2012. Exploring dysmenorrhoea and menstrual experiences among Lebanese female adolescents. *Eastern Mediterranean Health Journal* 18(8):857-863.
- Sanyal, S. and Ray, S. 2008. Variation in the menstrual characteristics in adolescents of West Bengal. *Singapore Medical Journal*. 49:542–550.
- Sathar, Z., Haque, M., Faizunnisa, A., Sultana, M., Lloyd, C., Diers, J. and Grant, M. 2001. Adolescents and youths in Pakistan: *a nationally representative survey*. Islamabad. Population council, 2003. Retrieved Nov.10, 2012, from http://www.nap.edu/openbook.php%3Frecord_i.
- Sharma, P., Malhotra, C., Taneja, D. K. and Saha, R. 2008. Problems related to menstruation amongst adolescent girls. *Indian J Pediatr*. 75 (2): 125–129.
- Shriver, K. E. 2007. Puberty health information. *Journal of Adolescent Health* 35(1):3-16.
- Singh, M. M., Devi, R. and Gupta, S. S. 1999. Awareness and health-seeking behaviour of rural adolescent school girls on menstrual and reproductive health problems. *Indian J Med Sci*. 53:439-43.
- Sommer, M. 2009. Ideologies of sexuality, menstruation and risk: girls' experiences of puberty and schooling in Northern Tanzania. *Culture, Health and Sexuality*. 11(4):383-398.
- Sonis, W. A., Comite, F. and Blue, J. 1985. Behaviour problems and social competence in girls with true precocious puberty. *Journal of Paediatrics*. 106:156-160.
- Strauch, B. 2003. *The Primal Teen: what the new discoveries about the teenage brain tells us about our kids*. 6th ed. New York: Anchor.
- Styne, D. M. and Grumbach, M. M. 2008. Puberty: *Ontogeny, neuroendocrinology, physiology, and disorders*. Williams textbook of endocrinology. 11th ed. Philadelphia, Pa: Saunders Elsevier. Chapter 24.
- Susman, E. J. and Rogol, A. 2004. *Puberty and psychological development. Handbook of adolescent psychology*. 2nd ed. Hoboken, NJ: Wiley. 15–44.

- Tazeen, S., Ali, P., Azam, A. and Humaira, W. 2004. Understanding of puberty and related health problems among female adolescents in Karachi, Pakistan. *Journal of Pakistan medical association*. 56(2):68-72.
- Ten, V.T. A. 2007. Menstrual Hygiene: A neglected condition for the achievement of several Millennium Development Goals. Retrieved April 04, 2013, from http://www.eepa.be/wcm/dmdocuments/BGPaper_Menstrual-Hygiene.pdf.
- WaterAid, 2009. Is menstrual hygiene and management an issue for adolescent school girls? A comparative study of four schools in different settings of Nepal. A *WaterAid in Nepal publication*, March 2009. Retrieved April 06, 2013, from <http://www.wateraid.org/nepal>.
- Weschler, T. 2002. *Taking charge of your fertility*. 10th ed. New York: HarperCollins. 359–362.
- World Health Organization, 2011. Preventing early pregnancy and poor reproductive outcomes among adolescents in developing countries. Retrieved April 20, 2013, from http://www.who.int/maternal_child_adolescent_health/htm/.
- Zuckerman, D., 2001. Early Puberty in Girls. *The Ribbon*. New York. Vol 6. May 2009. Retrieved Dec. 07, 2012, from <http://centre4research.org/./girls-to-women/>.

APPENDIX I

FOCUS GROUP DISCUSSION GUIDE

KNOWLEDGE, SOURCES OF INFORMATION AND EXPERIENCE OF PUBERTY AMONG JUNIOR SECONDARY SCHOOL FEMALE ADOLESCENTS.

Introduction

My name is Ekezie Uchechi. I am a postgraduate student of the Department of Health Promotion and Education, Faculty of Public Health, College of Medicine, University of Ibadan. I am carrying out a research on the “Knowledge, Sources of Information and Experiences of Puberty among junior secondary school female adolescents in Ibadan South West Local Government Area, Oyo state.

I will be helping to guide the discussion and make sure everybody has a chance to speak. I will like to record the information you provide with a tape recorder in order to get the whole details. I’m I permitted to do so?

Please remember, I am here to learn from you. Please don't tell me what you think I would like to hear. Tell me your views, whatever they are.

Before we go further, I would like us to introduce ourselves.

Now that we have introduced ourselves, let me explain the ground rules. If you want to speak, just indicate by raising up your hand and I will call on you. Please don't interrupt anyone and try to give everyone a chance to speak. Are there other rules we would like to add?

Questions	Probing questions
1. What are the challenges adolescents face?	<ul style="list-style-type: none"> • Physical challenges • Social challenges • Mental challenges
2. What is adolescence?	<ul style="list-style-type: none"> • Definition of adolescence • What is the age range of adolescents? • What are the characteristics of adolescents?
3. What is puberty?	<ul style="list-style-type: none"> • Definition and explanation of the word • What are some physical changes that occur during puberty in girls? • What are some emotional changes that takes place during puberty in girls? • At what age range does puberty occur in female adolescents? • What is growth spurt • How long does it last? • Which of the sex experiences growth spurt first during puberty?
4. What are adolescents' sources of information on puberty?	<ul style="list-style-type: none"> • What are the sources of information on the physical changes that that occur during puberty? • What are the sources of information on the emotional changes that that occur during puberty? • What are the preferred sources of information of puberty?
5. What is menstruation?	<ul style="list-style-type: none"> • Define and explain menstruation • Where does menstrual blood flow from? • What range is the length of days that it takes to complete one menstrual cycle?
6. What are the	<ul style="list-style-type: none"> • What are the beliefs about bathing and exercising

<p>misconceptions / myths about puberty?</p>	<p>during menstruation?</p> <ul style="list-style-type: none"> • What are the beliefs about taking cold drinks during menstruation? • What are the beliefs about having sex to stop menstrual pains?
<p>7. What are adolescents' experiences during puberty?</p>	<ul style="list-style-type: none"> • What are the physical changes that are experienced? • What are the emotional changes experienced? • What are the feelings when the breasts start to develop? • What are the feelings when hair begins to grow in the pubic regions? • At what age does menstruation occur? • What are the feelings when menstruation occurs for the first time? • How often does menstruation occur? • What are the problems that are being experienced during menstruation? • What type of help is sought when menstrual problem is encountered?
<p>8. How do these experiences affect adolescents?</p>	<ul style="list-style-type: none"> • Do they feel shy or concerned because of the changes they see in their body? • Do they avoid going to school, church/ mosque, doing physical activities when they are menstruating?

APPENDIX II

SELF ADMINISTERED QUESTIONNAIRE ON THE KNOWLEDGE, SOURCES OF INFORMATION AND EXPERIENCES OF PUBERTY AMONG JUNIOR SECONDARY SCHOOL FEMALE ADOLESCENTS IN IBADAN SOUTH WEST LOCAL GOVERNMENT AREA.

Assent form

My name is Ekezie Uchechi. I am a postgraduate student of the Department of Public Health, College of Medicine, University of Ibadan. I am carrying out a research on the Knowledge, Sources of Information and Experiences of Puberty among junior secondary school female adolescents. Some of the questions to be asked include your knowledge, sources of information, experience and health seeking behaviour of puberty and information about your background.

If you agree to participate, you are entitled to your own opinion and there is no right or wrong answer. I assure you that my interview with you will be kept secret and will be highly confidential. As soon as the questionnaires are filled, they will be kept where only my supervisor and I will have access to them and your names will not be required.

I will appreciate your sincere reply to the questions asked. If you are willing to participate, read the paragraph below and sign.

I have read the above information. I have the opportunity to ask questions and my questions have been satisfactorily answered. I consent voluntarily to participate in this study.

.....
Individual's signature

.....
Date

QUESTIONNAIRE ON KNOWLEDGE, SOURCES OF INFORMATION AND EXPERIENCES OF PUBERTY AMONG JUNIOR SECONDARY SCHOOL FEMALE ADOLESCENTS IN IBADAN SOUTH WEST LOCAL GOVERNMENT, NIGERIA

Section A: Respondent's Background (Please fill in/ tick as appropriate)

1. Age at last birthday.....
2. Class JSS
3. Religion
 1. Christianity
 2. Islam
 3. Traditional
 4. Others (please specify).....
4. Ethnic group
 1. Yoruba
 2. Hausa
 3. Igbo
 4. Others (please specify)
5. Father's Occupation.....
6. Mother's Occupation.....
7. Father's highest educational level
 1. Non formal education
 2. Primary
 3. Secondary
 4. Polytechnic/ College of Education
 5. University
 6. others (please specify).....
8. Mother's highest educational level
 1. Non formal education
 2. Primary
 3. Secondary
 4. Polytechnic/ College of Education

- 5. University
- 6. Others (please specify).....

Section B

Sources of Information of puberty

9. Have you ever received any information of puberty?

- 1. Yes
- 2. No

If No, go to question 11

10. From what source did you receive it?

- 1. School teacher
- 2. Parents
- 3. friends
- 4. sisters
- 5. brothers
- 6. doctor
- 7. Internet
- 8. Books/ magazines
- 9. Others (please specify).....

11. Have you received any information on menstruation?

- 1. Yes
- 2. No

If No, go to question 13

12. From what source did you learn about menstruation?

- 1. School teacher
- 2. Parents
- 3. Friend
- 4. Sisters
- 5. Brothers
- 6. Doctor
- 7. Internet

- 8. Books/ magazines.
- 9. Others (please specify).....

13. Have you heard about growth spurt?

- 1. Yes
- 2. No

If No, go to question 15

14. From what source did you learn about it?

- 1. School teacher
- 2. Parents
- 3. Friends
- 4. Sisters
- 5. Brothers
- 6. Doctor
- 7. Internet
- 8. Books/ magazines
- 9. Others (please specify).....

15. From what source would you prefer to receive information of puberty

- 1. School teacher
- 2. Mother
- 3. Father
- 4. Friends
- 5. Sister
- 6. Brother
- 7. Doctor
- 8. Internet
- 9. Books/magazines
- 10. Films/ videos
- 11. Others.....(specify)

Section C

Knowledge of puberty

16. Puberty is
1. changes that occur in the blood
 2. physical and emotional changes that occurs in adolescents.
 3. transition from childhood to adulthood
 4. none of the above
17. At what age range does puberty occur for the females
1. Between 40-45 years
 2. between 9-14 years
 3. between 20-30 years
 4. between 30-35 years
18. Puberty involves physical and emotional changes in the body
1. Yes
 2. No
19. Menarche is
1. deepening of the voice
 2. growth of breasts
 3. the first flow of menstrual blood among girls during puberty
 4. growth of pubic hairs
20. During puberty, which of the following takes place in girls
1. Breast development only
 2. Onset of menstruation only
 3. Breast development + Onset of menstruation
 4. Eyes get brighter + head is enlarged
 5. Breast development + hair grows in pubic regions and armpits + Onset of menstruation
 6. Breast development + hair grows in pubic regions and armpits + Onset of menstruation + increase in weight and height + enlargement of hips
 7. Others (Please specify.....)

21. The blood that flows during menstruation flows from the

- 1. bladder
- 2. uterus
- 3. blood vessels
- 4. capillaries

22. Menstrual cycle takes place between the range of

- 1. 26-35 days
- 2. 40-60 days
- 3. 30-45 days
- 4. 8-10 days

23. The flow of blood during menstruation lasts for

- 1. 3-7 days
- 2. 1 month
- 3. 1 day
- 4. 3 weeks.

Section D

Experiences of puberty

24. Have you entered the puberty period?

- 1. yes
- 2. No

If No, don't answer the questions in this section.

25. If yes, at what age?

26. Which of these changes did you notice in your body(Please choose one)

- 1. Breast development only
- 2. Menstruation onset only
- 3. Hair growth in the armpit and pubic region only
- 4. Pimples on the face only
- 5. Breast development + Menstruation onset only
- 6. Breast development + menstruation onset + hair growth in the armpit and pubic region

7. Breast development + menstruation onset + hair growth in the armpit and pubic region
+ pimples on the face

27. Did you experience these changes in the body before your friends?

1. Yes

2. No

If No, go to question 29.

28. How did you feel? Different

1. Shy

2. Concerned

3. Happy

4. Others (please specify)

29. Did your friends experience these changes in their body before you?

1. Yes

2. No

If No, go to question 31.

30. How did you feel?

1. Different

2. Shy

3. Concerned

4. Happy

5. Others (please specify)

31. Have you started developing breasts?

1. Yes

2. No

If No, go to question 35

32. At what age did your breast start developing?

33. How did you feel about it? (Please tick one)

1. Shy

2. Embarrassed

3. Happy

4. Concerned

5. Indifferent

34. Did you experience any pain when your breast was developing?

1. Yes

2. No

35. Have you started growing hair in your armpit and pubic area?

1. Yes

2. No

If No, go to Question 37

36. How do feel about that?

1. Concerned

2. Unconcerned

3. Shy

4. Indifferent

5. Others (please specify)

37. Have you noticed an increase in your body weight and height?

1. Yes

2. No

If No, go to question 39

38. How did you feel about it?

1. Concerned

2. Unconcerned

3. Shy

4. Indifferent

5. Others (please specify)

39. Do you have pimples on your face?

1. Yes

2. No

If No, go to question 41

40. How do you feel about it?

1. Concerned

2. Unconcerned

- 3. Shy
- 4. Indifferent
- 5. Others (please specify)

41. Do you have a sexual feeling for the opposite sex?

- 1. Yes
- 2. No

Experience of menstruation

42. Have you started menstruating?

- 1. Yes
- 2. No

If No, don't answer the questions in this section.

43. At what age did you see your first menstruation?

44. How did you feel when you saw your first menstruation?

- 1. Happy
- 2. Angry
- 3. surprised
- 4. Afraid
- 5. Embarrassed
- 6. Others (Please specify)

45. Who were you living with when you first saw your menstruation? (Please tick one)

- 1. With both parents
- 2. With father only
- 3. With mother only
- 4. With a friend
- 5. With elder brother
- 6. With elder sister
- 7. With grand parents
- 8. With a relative
- 9. In the school hostel
- 10. Others (Please specify)

46. Did you discuss the experience with someone?

- 1. Yes
- 2. No

If No, go to question 48

47. Who did you discuss it with?

- 1. Mother
- 2. Father
- 3. School teacher
- 4. Sister
- 5. Brother
- 6. Friend
- 7. Mother and sister
- 8. Mother and friends

48. Why did you not discuss it?

- 1. Was shy
- 2. Was afraid
- 3. Was shy and afraid
- 4. Felt it is normal
- 5. Have the information about it already
- 6. Others (Please specify).....

49. Do you see your menstruation every month?

- 1. Yes
- 2. No

50. How long does it last?

- 1. 1 day
- 2. 3-5 days
- 3. 7 days
- 4. Others (Please specify)

51. Do you experience any menstrual problem?

- 1. Yes
- 2. No

If No, go to question 58

52. Which of the following do you experience?

- 1. Headache only
- 2. Headache + stomach pain
- 3. Headache + weakness
- 4. Headache + stomach pain + vomiting
- 5. Weakness + stomach pain
- 6. Others (Please specify).....

53. Do you seek any medical help when you encounter any menstrual problem?

- 1. Yes
- 2. No

If No, go to question 56.

54. From where do you receive medical help?

- 1. School clinic
- 2. Hospital
- 3. Patent Medicine Vendor
- 4. Pharmacy

55. What medication did you receive?

- 1. Drugs
- 2. Injection
- 3. Drugs/ injection
- 4. Others (Please specify).....

If you answered Yes in question 53, skip question 56

56. Why did you not seek medical help?

- 1. No time
- 2. Don't have money
- 3. Don't experience menstrual problems
- 4. Felt it is normal
- 5. Can take care of myself
- 6. Others (Please specify).....

57. What other thing do you do to relief the problem?

1. Take herbs
2. Take water
3. Take salt and water solution
4. Drink garri with salt
5. Exercise
6. Relax
7. Place a bottle of warm water below the abdomen
8. Others (Please specify).....

58. Do you avoid some activities when you are menstruating?

1. Yes
2. No

If No, go to question 60.

59. Which of the following activities do you avoid?

1. Going to School
2. Physical exercise
3. Going to Church/ Mosque
4. Going to School + Going to Church/ Mosque
5. Going to School + Physical exercise
6. Going to School + Going to Church/ Mosque + Physical exercise
7. Others (specify).....

60. What do you use during your menstruation?

1. Pieces of Cloth
2. Toilet paper
3. Sanitary pad
4. Tampon
5. Others (Please specify).....

APPENDIX III

INFORMED CONSENT FORM

Dear Parent/Guardian,

My name is Ekezie Uchechi. I am a postgraduate student of the Department of Public Health, College of medicine, University of Ibadan. I am carrying out a research on the Knowledge, Sources of Information and Experiences of Puberty among junior secondary school female adolescents. Your child has been selected for the purpose of this research. Some of the questions to be asked include her knowledge, sources of information, experience and health seeking behavior on puberty and information about her background.

The findings from this study will help in the design of training programmes and publications on adolescent reproductive health issues. The identity and responses of your child will be kept strictly confidential and will be used for the purpose of this research only. Please note that your child do not have to write her name on this questionnaire. However, participation is voluntary.

Would you want your child to participate in the study? (1) YES (2) NO

APPENDIX IV

Ambiguous pretest questions and their modified form

The pre-test questions which the respondents were unable to answer are as follows:

15. From what source would you prefer to receive information of puberty?

	Most important (1)	Second most important (2)	Third most important (3)
School teacher			
Mother			
Father			
Friends			
Sister			
Brother			
Doctor			
Books/ magazines			
Films/ videos			
Internet			
Others.....(specify)			

26. Mention the changes you have noticed in your body?

.....
.....
.....

48. Why did you not discuss it?

.....
.....

56. Why did you not seek medical help?

.....
.....

57. What other thing do you do to relief the problem?

.....
.....
.....

The above pre-tested questions were modified in the questionnaire used for the main data collection as follows:

15. From what source would you prefer to receive information of puberty?

12. School teacher

13. Mother

14. Father

15. Friends

16. Sister

17. Brother

18. Doctor

19. Internet

20. Books/magazines

21. Films/ videos

22. Others (specify).....

26. Which of these changes did you notice in your body (Please choose one)

8. Breast development only

9. Menstruation onset only

10. Hair growth in the armpit and pubic region only

11. Pimples on the face only

12. Breast development + Menstruation onset only

13. Breast development + menstruation onset + hair growth in the armpit and pubic region

14. Breast development + menstruation onset + hair growth in the armpit and pubic region + pimples on the face

15. Others (please specify).....

48. Why did you not discuss it?

7. Was shy

8. Was afraid

9. Was shy and afraid

- 10. Felt it is normal
- 11. Have the information about it already
- 12. Others (Please specify).....

56. Why did you not seek medical help?

- 7. No time
- 8. Don't have money
- 9. Don't experience menstrual problems
- 10. Felt it is normal
- 11. Can take care of myself
- 12. Others (Please specify).....

57. What other thing do you do to relief the problem?

- 9. Take herbs
- 10. Take water
- 11. Take salt and water solution
- 12. Drink *garri* with salt
- 13. Exercise
- 14. Relax
- 15. Place a bottle of warm water below the abdomen
- 16. Others (Please specify).....

UNIVERSITY OF IBADAN

APPENDIX V

Proportionate sampling of students required from each class.

Name of school	No. of students in each class	Total no. of students to be selected from each class
Oke-Bola Comprehensive High School	J.S.S.1 = 78	$\frac{78 \times 68}{319} = 17$
	J.S.S.2 = 127	$\frac{127 \times 68}{319} = 27$
	J.S.S.3 = 114	$\frac{114 \times 68}{319} = 24$
		= 68
People's Girls Grammar School	J.S.S.1 = 224	$\frac{224 \times 169}{800} = 47$
	J.S.S.2 = 308	$\frac{308 \times 169}{800} = 65$
	J.S.S.3 = 268	$\frac{268 \times 169}{800} = 57$
		= 169
Oke-Ado High School	J.S.S.1 = 62	$\frac{62 \times 47}{225} = 13$
	J.S.S.2 = 67	$\frac{67 \times 47}{225} = 14$
	J.S.S.3 = 96	$\frac{96 \times 47}{225} = 20$
		= 47
Community Grammar School, Elewura	J.S.S.1 = 75	$\frac{75 \times 64}{305} = 16$
	J.S.S.2 = 96	$\frac{96 \times 64}{305} = 20$
	J.S.S.3 = 134	$\frac{134 \times 64}{305} = 28$
		= 64
Apata Community Grammar School.	J.S.S.1 = 70	$\frac{70 \times 72}{342} = 15$
	J.S.S.2 = 152	$\frac{152 \times 72}{342} = 32$
	J.S.S.3 = 120	$\frac{120 \times 72}{342} = 25$
	Total = 1991	
		Total = 420

APPENDIX VI

Number of students in the arms of classes and the number of students selected from the arms of classes using proportionate sampling technique

Name of school	Number of students in the arms of classes	Using proportionate sampling technique to obtain the no. of students from each arm of classes.
Oke-Bola Comprehensive High School	J.S.S.1 A = 40 J.S.S.1 B = 38 J.S.S.2 A= 45 B = 42 C= 40 J.S.S.3 A = 45 B = 40 C= 29	$\frac{40 \times 17}{78} = 9$ $\frac{38 \times 17}{78} = 8$ $\frac{45 \times 27}{127} = 10$ $\frac{42 \times 27}{127} = 9$ $\frac{40 \times 27}{127} = 8$ $\frac{45 \times 24}{114} = 10$ $\frac{40 \times 24}{114} = 8$ $\frac{29 \times 24}{114} = 6$ $\frac{55 \times 47}{224} = 12$ $\frac{52 \times 47}{224} = 11$ $\frac{53 \times 47}{224} = 11$
People's Girls Grammar School	J.S.S.1 A= 55 B= 52 C= 53	$\frac{55 \times 47}{224} = 12$ $\frac{52 \times 47}{224} = 11$ $\frac{53 \times 47}{224} = 11$

	<p>D=64</p> <p>J.S.S. 2 A= 58</p> <p>B= 57</p> <p>C= 58</p> <p>D= 64</p> <p>E=71</p> <p>J.S.S.3 A=58</p> <p>B= 68</p> <p>C= 67</p> <p>D=75</p>	<p>$\underline{64 \times 47} = 13$</p> <p>224</p> <p>$\underline{58 \times 65} = 12$</p> <p>308</p> <p>$\underline{57 \times 65} = 12$</p> <p>308</p> <p>$\underline{58 \times 65} = 12$</p> <p>308</p> <p>$\underline{64 \times 65} = 14$</p> <p>308</p> <p>$\underline{71 \times 65} = 15$ = 169</p> <p>308</p> <p>$\underline{58 \times 57} = 12$</p> <p>268</p> <p>$\underline{68 \times 57} = 15$</p> <p>268</p> <p>$\underline{67 \times 57} = 14$</p> <p>268</p> <p>$\underline{75 \times 57} = 16$</p> <p>268</p>
Oke-Ado High School	<p>J.S.S.1 A= 38</p> <p>B= 24</p> <p>J.S.S.2 A= 40</p> <p>B= 27</p> <p>J.S.S.3A= 49</p>	<p>$\underline{38 \times 13} = 8$</p> <p>62</p> <p>$\underline{24 \times 13} = 5$</p> <p>62</p> <p>$\underline{40 \times 14} = 8$</p> <p>67</p> <p>$\underline{27 \times 14} = 6$ = 47</p> <p>67</p> <p>$\underline{49 \times 20} = 10$</p>

	B= 47	96 $\underline{47 \times 20} = 10$ 96
Community Grammar School, Elewura	J.S.S.1A= 42 B= 33 J.S.S.2A = 52 B = 44 J.S.S.3A = 48 B = 45 C = 41	$\underline{42 \times 16} = 9$ 75 $\underline{33 \times 16} = 7$ 75 $\underline{52 \times 20} = 11$ 96 $\underline{44 \times 20} = 9$ = 64 96 $\underline{48 \times 28} = 10$ 134 $\underline{45 \times 28} = 9$ 134 $\underline{41 \times 28} = 9$ 134
Apata Community Grammar School.	J.S.S.1 A = 38 B = 32 J.S.S.2 A = 55 B = 49 C = 48 J.S.S.3 A= 47 B = 41 C = 32	$\underline{38 \times 15} = 8$ 70 $\underline{32 \times 15} = 7$ 70 $\underline{55 \times 32} = 12$ 152 $\underline{49 \times 32} = 11$ 152 $\underline{48 \times 32} = 10$ = 72 152 $\underline{47 \times 25} = 10$ 120 $\underline{41 \times 25} = 8$ 120 $\underline{32 \times 25} = 7$ 120

APPENDIX VII

UNIVERSITY OF IBADAN

TELEGRAMS.....

TELEPHONE.....



MINISTRY OF HEALTH
DEPARTMENT OF PLANNING, RESEARCH & STATISTICS DIVISION
PRIVATE MAIL BAG NO. 5027, OYO STATE OF NIGERIA

Your Ref. No.

All communications should be addressed to

the Honorable Commissioner quoting

Our Ref. No. AD 13/ 479/233

25th June, 2012

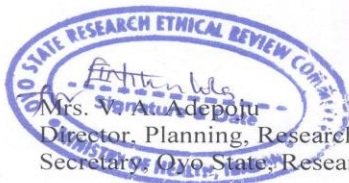
The Principal Investigator,
Department of Health Promotion & Education,
College Of Medicine,
University of Ibadan,
Ibadan.

Attention: Ekezie Uchechi

Ethical Approval for the Implementation of your Research Proposal in Oyo State

This acknowledges the receipt of the corrected version of your Research Proposal titled: "Knowledge, Sources of Information and Experience of Puberty among Junior Secondary School Female Adolescents in Ibadan South West Local Government Area, Oyo State."

2. The committee has noted your compliance with all the ethical concerns raised in the initial review of the proposal. In the light of this, I am pleased to convey, to you, the approval of committee for the implementation of the Research Proposal in Oyo State, Nigeria.
3. Please note that the committee will monitor, closely, and follow up the implementation of the research study. However, the Ministry of Health would like to have a copy of the results and conclusions of the findings as this will help in policy making in the health sector.
4. Wishing you all the best,



Mrs. V. A. Adedolu
Director, Planning, Research & Statistics
Secretary, Oyo State, Research Ethical Review Committee