# RELATIONSHIP BETWEEN KNOWLEDGE OF REPRODUCTIVE HEALTH AND CONTRACEPTIVE USE AMONG TERTIARY INSTITUTIONS STUDENTS IN NIGER STATE

**BY**

**ISA ABUBAKAR**
**MED/EDUC/57421/2005-2006**

**A THESIS SUBMITTED TO THE POSTGRADUATE SCHOOL, AHMADU BELLO UNIVERSITY IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF MASTER IN HEALTH EDUCATION**

**DEPARTMENT OF PHYSICAL AND HEALTH EDUCATION**
**FACULTY OF EDUCATION, AHMADU BELLO UNIVERSITY, ZARIA**

**JUNE 2011**

## DECLARATION

I certify that this thesis has been written by me. It is a record of my own research work and it has not been presented in any previous application for a higher degree. All sources of information are acknowledged by means of references.

---

Isa Abubakar

---

Date

## CERTIFICATION

This thesis entitled Relationship between knowledge of Reproductive Health and contraceptive Use among tertiary Institutions Students in Niger State by Isa Abubakar, meets the regulations governing the award of the Degree of Master's in Health Education of Ahmadu Bello University, Zaria, Nigeria and is approved for its contribution to knowledge and literary presentation.

---

Professor (MRS) C. O. Adegbite — Date
Chairman, Supervisory Committee

---

Dr. (MRS) M. A. Suleiman — Date
Member, Supervisory Committee

---

Professor C. E. Dikki — Date
Head of Department

---

Dr. E. A. Gunen — Date
Postgraduate Coordinator

---

Professor A. A. Joshua — Date
Dean, Postgraduate School

## DEDICATION

To all generations of youths.

## ACKNOWLEDGEMENTS

How does one say "thank you" when there are so many people to thank? Obviously this thesis is a thank you to Allah (SWT) whose will has been fulfilled. Yet, the people most directly responsible for this thesis becoming a reality include the researcher's supervisors, Professor (MRS) Adegbite, fondly called 'Mama', and Dr. (MRS) Suleiman, also called 'Aunty'. The researcher wishes to thank you for stringing up the pieces of this work together into a meaningful whole. Special appreciation goes to Saleh N. Garba, who is considered as a worthy friend and brother for his consistent concern, "harassment", and encouragement. To the researcher's father, late Alhaji Isa Umaru (of blessed memories) whose death occurred at a critical moment of the researcher's academic endeavor thanks for your wisdom and inspiration. May Allah grant you al-jannatu firdaus. Special thanks go to the researcher's mother for the blessings, prayers and inspiration, only Allah can reward you. The researcher thank other members of the family; Hassanat Y. Garba, for your conjugal love and support; Nana-Fatima, Sageerah (Rahma) and newest member, Nazeefah (Maryam) for going through periods of 'planned and unplanned paternal neglect'; Aunty Maryam, her husband, Maifada, and their children, Babawo, Ummi, Iya-gana, and Abba, for family support. Very special thanks to late Comfort Dambo for gift of friendship, to the entire staff and colleagues of the department of Nursing Sciences for being great partners. Also, the entire staff of the department of Physical and Health Education, particularly Prof. Gwani and Prof. Kabido, the researcher appreciates you all. Finally, the researcher wishes to acknowledge Mrs. L. Duruji and other individuals too numerous to mention, who have contributed toward the success of this project. May God bless you all!

## ABSTRACT

The study ‘’Relationship between knowledge of Reproductive Health and Contraceptive Use among Tertiary Institutions’ Students in Niger State” was conducted to determine the knowledge of reproductive health and its relationship with contraceptive use among the respondents. A cross-sectional descriptive survey design was used. The thirteen tertiary institutions in Niger State were clustered into University, Polytechnic, Monotechnic, and College of Education. One tertiary institution was selected from each cluster from where 700 respondents were selected to serve as the sample. The instrument for data collection was a structured questionnaire consisting of 52 items covering reproductive health knowledge and contraceptive use. The collected data from the returned questionnaires were statistically analyzed using both descriptive and inferential statistics. Descriptive statistics such as frequency distribution and percentages were used to describe the reproductive health knowledge and contraceptive use among Tertiary institutions students, while chi square statistic was used to determine relationship between them. Student t-test and Analysis of variance (ANOVA) were used to determine the difference between and among the students. The results of the study revealed a significant level of reproductive health knowledge, low contraceptive use, and moderately strong positive relationship between reproductive health knowledge and contraceptive use. Also, significant difference was found to exist in contraceptive use according to sex, religion, and marital status. However, no significant difference was established in the knowledge of reproductive health according to religion, age and ethnicity. Based on these findings, it was recommended that young people be empowered with necessary skills needed to translate knowledge into action, there should be improved access to reproductive health services; also reproductive health education should consider variables like marital status, religion and sex.

## TABLE OF CONTENTS


| | | |
|---|---|---|
| Title | | i |
| Declaration | | ii |
| Certification | | iii |
| Dedication | | iv |
| Acknowledgement | | v |
| Abstract | | vi |
| Table of Content | | vii |
| **CHAPTER ONE: BACKGROUND OF THE STUDY** | | |
| 1.1 | Introduction | 1 |
| 1.2 | Statement of the problem | 3 |
| 1.3 | Significance of the study | 6 |
| 1.4 | Objectives | 6 |
| 1.5 | Basic assumptions | 8 |
| 1.6 | Hypotheses | 8 |
| 1.7 | Delimitation | 7 |
| 1.8 | Limitations | 9 |
| **CHAPTER TWO: REVIEW OF RELATED LITERATURE** | | |
| 2.0 | Introduction | 10 |
| 2.1 | The Concept of Adolescence | 11 |
| | - Significant Physiological changes in Adolescence | 12 |

- Socio-cultural influence on Adolescent Sexual Behaviour 12

**2.2 Reproductive Health** 13

- Reproductive Health Education in Nigeria 13

- Nigerian Guidelines Development Process 16

- Goals and Values 19

2.3 Contraceptive Technology 20

2.4 The Menstrual Cycle 22

Physiology of Menstrual Cycle 22

- Menstrual phase 23

- Proliferative Phase 24

- Secretory Phase 25

2.5 Hormonal Contraceptives 26

2.6 Oral Contraceptive (OC) 26

- Mechanism of action of Oestrogen as contraceptive 27

- Mechanism of action of Progesterone as contraceptive 28

Combined Oral Contraceptives (COC) 30

- Indications 31

- Contraindications 32

- Procedure for taking the Pill 32

- Effectiveness 33

- Side effects 33

2.7 Progestin-only Contraceptives (POC) 34

- Indications 35
- Contraindications 36
- Procedure for taking the Pill 36
- Effectiveness 37
- Side effects 37

2.8 Injectable Contraceptives 37

2.8.1 Combined Injectable Contraceptives (COC) 38

- Indications 40
- Contraindications 40
- Procedure for use 40
- Effectiveness 41
- Side effects 41

2.8.2 Progestin-Only Injectable Contraceptives (PIC) 42

- Depot medroxy progesterone acetase 43
- Indications 44
- Contraindications 44
- Effectiveness 44
- Side effects 45

2.8.3 Implants 46

- Indications 46
- Contraindications 47
- Procedure for insertion 47

- Procedure for removal 48
- Side Effects 48
2.8.4 Intra-Uterine Devices (IUD) 49
- Mechanism of action 50
- Types 50
- Indications 52
- Contraindications 52
- Effectiveness 52
- Procedure for insertion 53
- Removal of IUD 54
- Side Effects 54
2.8.5 Barrier Method and Spermicidals 55
- Condom 55
- Procedure for condom use 57
- The Female Condom 58
- New Condoms for Men 59
2.8.6 Diaphragm 60
- Types 61
- Inserting the Diaphragm 62
- Removing the Diaphragm 63
2.8.7 The Cervical Cap 64
- Types 65

2.8.8 Contraindications and Side Effects 66

2.9 SPERMICIDES 67

- Effectiveness 68

- Insertion of Spermicides 68

- Side Effects 69

2.9.1 STERILIZATION 69

Female Sterilization 69

Methods 70

Complications 73

Tubal Methods 73

Effectiveness 74

Male Sterilization 75

-Complications 76

2.10 NATURAL FAMILY PLANNING 76

-Physiological Basis for Natural Methods 77

Natural Contraceptive Options 79

-Abstinence 79

-Withdrawal (Coitus Interruptus) 79

-Calender Method 80

-Ovulation Method 81

-Basal Body Temperature (BBT) Method 83

-Sympto-Thermal Method 83

-Lactational Amenorrhoea Method (LAM) 84

-Standard Days Method (SDM) 85

-The Two Day Method 87

-Electronic Fertility Computers 88

9.12 SUMMARY 89

**CHAPTER THREE: METHODOLOGY**

3.1 INTRODUCTION 91

3.2 RESEARCH DESIGN 91

3.3 POPULATION OF THE STUDY 91

3.4 SAMPLE AND SAMPLING PROCEDURES 92

3.5 INSTRUMENT FOR DATA COLLECTION 95

3.6 VALIDATION OF QUESTIONNAIRE 96

3.7 STATISTICAL TECHNIQUES 96

**CHAPTER FOUR: PRESENTATION AND ANALYSIS OF DATA**

4.1 INTRODUCTION 98

4.2 RESULTS 98

4.3 Test of Hypothesis 102

-Sub-hypothesis 1 107

-Sub-Hypothesis 2 108

-Sub-hypothesis 3 109

-Sub-hypothesis 4 111

-Sub-hypothesis 5 112

-Sub-hypothesis 6 113

-Sub-hypothesis 7 114

-Sub-hypothesis 8 115

4.3 DISCUSSION 117

4.3.1 Knowledge of Reproductive Health 117

4.3.2 Contraceptive Use 118

4.3.3 Relationship Between Knowledge of Reproductive Health and Contraceptive use 119

4.3.4 Knowledge of Reproductive Health by Demographic Characteristic 120

4.3.5 Differences in Contraceptive Use 121

**CHAPTER FIVE: SUMMARY, CONCLUSION AND RECOMMENDATIONS**

5.1 SUMMARY 123

5.2 FINDINGS 124

5.3 RECOMMENDATIONS 125

5.4 RECOMMENDATIONS FOR FURTHER STUDIES 126

REFERENCES 127

APPENDICES 132

Appendix A: Request to vet Questionnaire 132

Appendix B: Request to administer Questionnaire 133

Appendix C: Request for the completion of Questionnaire 134

Appendix D: Questionnaire 135

Appendix E: Marking guide to Section B of Questionnaire 142

## LIST OF TABLES


| Table No. | Title | Page |
|---|---|---|
| 3.1 | Distribution of Tertiary Institutions according to Clusters | 93 |
| 3.2 | Summary of sampled Department and Students | 95 |
| 4.1 | Distribution by Age, Sex and Religion | 99 |
| 4.2 | Distribution of Respondents by Ethnicity and Marital Status | 101 |
| 4.3 | Percentage distribution of Responses on Knowledge of Reproductive Health | 102 |
| 4.4 | Distribution of respondents according to contraceptive Use | 104 |
| 4.5 | Knowledge of Reproductive health and Contraceptive use | 106 |
| 4.6 | Summary of ANOVA for Knowledge of Reproductive Health according to Schools | 107 |
| 4.7 | Summary of ANOVA for Knowledge of Reproductive Health according to Religion | 109 |
| 4.8 | Summary of ANOVA for Knowledge of Reproductive Health according to Age | 110 |
| 4.9 | Summary of Student t-Test for Male and Female respondents' Knowledge of Reproductive Health | 111 |
| 4.10 | Summary of ANOVA for Knowledge of Reproductive Health according to Ethnic groups | 112 |

4.11 Summary of $x^2$ for Males and Females as regards Use of Contraceptives 113

4.12 Summary of $x^2$ for Muslims and Christians as regards the Use of Contraceptives 115

4.13 Summary of $x^2$ for students' use of Contraceptive according to Marital Status 116

# CHAPTER ONE

# INTRODUCTION

## 1.0 INTRODUCTION

Adolescence is a period characterized by the onset of primary sexual characteristic changes (that is, the growth and maturation of the reproductive structures such as fallopian tubes, uterus and vagina in females, penis and testes in males) and secondary sexual characteristic changes (such as breast growth, appearance and increase in pubic hair, appearance of facial hair in males, voice change and changes in body shape). Accompanying these changes in anatomical maleness and femaleness are physiological changes that lead to potential realization of the reproductive role. These physiological changes include menstruation and ovulation in the female and the beginning of sperm production in male. (Chiwuzie and Akpakpan, 2001)

At the onset of puberty, however, the adolescent has learnt that he or she is a boy or a girl and looks forward to becoming a man or a woman. He can become comfortable and confident about his developing capacity to be aroused and respond erotically. At this stage, he is preparing to engage in meaningful interpersonal relationships. At the same time, adolescents experience strong, often

conflicting emotions and social pressures as they move away from childhood dependence towards more independent adulthood. Most of them are unprepared for the situations they face. As a result, young people's decisions and sexual activities during their transition to adulthood can affect the rest of their lives.

Most of the serious reproductive health problems among youths especially the adolescents have been attributed to ignorance, misinformation, superstitious beliefs, conservative attitudes and high risk sexual behaviour (Ladipo *et al.,* 1996 and Amazigo *et al.,* 1997). For instance, demographic health survey in Colombia, 1990, revealed that the median age at first sexual intercourse is 20 years, and similar survey in Nigeria at the same period was 16.6 years (McCauley and Salter, 1995).

Each year, about 15 million women under age 20 give birth, accounting for up to one-fifth of all births worldwide (Population Reference Bureau [PRB] and Centre for Population Options [CPO], 1994). Many of these pregnancies and births are unintended. Unintended pregnancies often end in abortion (Bledsoe and Cohen, 1998). Most of these abortions are unsafe, and for some, unsafe abortion results in life-long disability, infertility or death (Brabin *et al.,* 1995).

Young people form one of the largest groups with unmet needs for reproductive health services. They need to be able to protect themselves from unwanted sex, unplanned pregnancies, early childbearing and abortions; and by extension, the resultant life-long disability, infertility or death.

Empowerment with knowledge of reproduction through education has been advocated and acclaimed as one of the most effective intervention activities to reverse the adolescent reproductive health problems, especially at the community level (Family Health International [FHI] 2003).

It is on this basis that the relationship between knowledge of reproductive health and contraceptive use among tertiary institutions' students in Niger State is undertaken.

## 1.2 STATEMENT OF THE PROBLEM

One-third of the world's population is between 10 and 24 years of age and four out of five of these young people live in developing countries (Friedman, 1993). Many things are tried for the first time in adolescence and new pattern of behaviour that may last a lifetime are also formed in adolescence.

In Nigeria, like most developing countries, children and adolescents are denied access to information on reproductive health subjects and sexuality (Uwakwe, 1993). Reproductive health education for adolescents remains controversial issue in Nigeria. Surveys conducted nationally reveal that parents

are not forthcoming as expected of them, as primary sexuality educators for their children. Educational institutions also provide little or no sexuality education for young people and so the school children are left to the equally misinformed peers as their primary source of information on these issues (Action Health Incorporated, [AHI], 1996).

Adolescents have therefore remained a major high risk group for reproductive health problems. Oladipo (1999) has shown that sexual activity among unmarried adolescents in Nigeria is high and rising. Unfortunately, majority of the sexual intercourse among adolescents are unprotected, thereby exposing them to sexually transmitted infections, teenage pregnancies and abortions.

In another study, Moronkola and Idris (2000), cited Araoye and Fakeye (1998) as asserting that despite widespread awareness of contraception and the sexual transmission of HIV infection, only 72% of respondents had used contraceptive. The preceding research findings have undoubtedly confirmed that Nigeria's adolescents have remained a major high risk group for reproductive health problems, with unmet needs for reproductive health services. For adolescents to be able to protect themselves from risky sexual behaviour, they need to understand what constitutes risky sexual practices and what to do to protect themselves from these practices. It is on this basis that the study –

"Knowledge of Reproductive Health and Contraceptive Use among Tertiary Institutions' Students in Niger State" is undertaken to specifically provide answers to the following research questions.

**Research Questions**

(1) Are students of tertiary institutions in Niger state knowledgeable about reproductive health?

(2) Do students of Niger state tertiary institutions use contraceptives?

(3) What is the relationship between knowledge of reproductive health and use of contraceptives among students of tertiary institutions in Niger state?

(4) Is reproductive health knowledge influenced by demographic characteristics of students of tertiary institutions in Niger state?

(5) Is use of contraceptive influenced by demographic characteristics of students of tertiary institutions in Niger state?

## 1.3 PURPOSE OF THE STUDY

The primary purpose of the study was to investigate the relationship between reproductive health knowledge and contraceptive use among tertiary institutions' students in Niger state. The specific purposes of the study are:

1. To determine the adequacy of reproductive health knowledge among students of tertiary institutions in Niger state.

2. To determine the relationship between reproductive health knowledge and contraceptive practice.
3. To identify contraceptive practice among students of tertiary institutions in Niger state.
4. To determine the influence of demographic characteristics on reproductive health knowledge among tertiary institutions' students in Niger state.
5. To determine the influence of demographic characteristics on contraceptive use among tertiary institutions' students of Niger state.

## 1.4 SIGNIFICANCE OF THE STUDY

The main focus of this study is to determine the relationship between reproductive health knowledge and contraceptive use among students of tertiary institutions in Niger state. Findings from the study would:

1. Highlight the reproductive health needs of adolescents of Nigerian tertiary institutions. These findings would be used by policy makers and educators to address the identified needs.
2. Establish a profile of contraceptive practices among students of tertiary institutions in Nigeria.
3. Highlight the relative influence of reproductive health knowledge on sexual behaviour among adolescents in Nigerian tertiary institutions.

4. Highlight the relationship between demographic characteristics and reproductive health knowledge and contraceptive use

## 1.5 HYPOTHESES

To answer the research questions, the following hypotheses are formulated:

**Major Hypothesis**

1. There is no significant relationship between knowledge of reproductive health and contraceptive use among tertiary institutions' students in Niger State.

**Sub-hypothesis**

1. There is no significant difference in reproductive health knowledge of students from different types of tertiary institutions in Niger State.
2. There is no significant difference in reproductive health knowledge of tertiary institutions' students from different religions in Niger State.
3. There is no significant difference in reproductive health knowledge of tertiary institutions' students of different age groups in Niger State.
4. There is no significant difference in reproductive health knowledge of male and female students of tertiary institutions in Niger state.
5. There is no significant difference in reproductive health knowledge of tertiary institutions' students of different ethnicity in Niger State.
6. There is no significant difference in contraceptive use between male and female students of tertiary institutions in Niger state.

7. There are is no significant difference in contraceptive use among students of tertiary institutions of Niger state according to their religion.
8. There is no significant difference in contraceptive use of tertiary institutions students of different marital status in Niger State.

## 1.6 BASIC ASSUMPTIONS

Based on available research evidence and established knowledge, the following assumptions are made for the purpose of this study:

1. Young people often know little or have incorrect information about fertility and contraception.
2. Adequate reproductive health knowledge promotes healthy sexual behaviour.
3. Young people are less likely to use contraceptive in spite of their sexual activity.
4. Ignorance about reproductive health tends to increase risky sexual behaviour.

## 1.7 DELIMITATION

The study is delimited to:

1. Reproductive health knowledge and contraceptive practices among students of tertiary institutions in Niger state.

2. The population of the study is students admitted into tertiary institutions in Niger state.

## 1.8 **LIMITATIONS**

Since this study made use of structured questionnaires as the instrument for data collection, self-report on sensitive issues like contraceptive use may not be very reliable. Consequently, adequate efforts were made to ensure confidentiality while collecting data and in the analysis and interpretation of the results.

# CHAPTER TWO

# REVIEW OF RELATED LITERATURE

## 2.0 INTRODUCTION

In recent times, education has remained a central component of health and social intervention programmes. In most cases it has been advocated and acclaimed as one of the most effective intervention activities, especially at the community level (Family Health International [FHI], 2003).

While frantic efforts continue to be made to improve maternal health and reduce mortality through family health education programmes, there is still a protracted reluctance by adults to the idea of sex education for children and adolescents. The general fear is that the exercise will "pollute" and corrupt the minds of children, lead to the initiation of early sex as well as encourage sexual promiscuity amongst them (Ebong, 1994).

Series of researches have reported serious reproductive health problems among youths especially the adolescents: most of which have been attributed to ignorance, misinformation, superstitious beliefs, conservative attitudes and high risk sexual behaviour (Ladipo et al, 1996; Amazigo et al, 1997).

This chapter reviews literature related to this study. The review is presented under the following subheadings:

a) The concept of reproductive health

b) Reproductive health education in Nigeria

c) Contraceptive technology

d) Summary

## 2.1 REPRODUCTIVE HEALTH

The history of Reproductive health dates back to the World Conference on Population held in Bucharest in 1974 where Family Planning was identified as the key to the control of population (Adesokan, 2010). This was made an integral part of Maternal and Child Health. A decade later, at the population Conference held in Mexico in 1984, it was decided that Family Planning be integrated into Primary Health Care to ensure effective output.

The concept of Reproductive Health started in 1994 at the International Conference on Population (ICPD) held in Cairo, Egypt (ICPD, 1994).

Reproductive health is a state of complete physical, mental and social wellbeing and not merely the absence of disease or infirmity in all matters relating to the reproductive system, and its functions and process. This implies that people are able to have satisfying and safe sex lives and that they have the capacity to have children and freedom to decide if, when and how often to do so (WHO, 1994).

A search of population literature as recent as the last one decade indicate the absence of reproductive health as a distinction in proximate determinants or other factors of population or demographic discourse, or of health surveys. However, it must be observed that a few of the issues involved in reproductive

health such as contraception, abortion, pathological sterility and bacterial amenorrhea feature in discourse of fertility and population (Emeka, 2000).

Reproductive health concept puts individual's health right and development at the centre of policies, programmes and implementation plans. It emphasizes the strategic roles of information, education, community mobilization and participation, women empowerment and provision of quality care for all persons including the poor and the marginalized groups. It is a cycle approach in which Reproductive health are not limited to women of reproductive age but extended to include life time concerns for both men and women from birth to old age. It is a holistic approach to reproductive health needs of family as it focuses on the needs of both sexes and all age groups. If reproductive health is not positively promoted, there may be a situation where teenage pregnancy and "out of union" deliveries will have a high prevalence. The incidence of sexually transmitted infections including HIV/AIDS is an issue in reproductive health.

Contraceptive use and other family planning services are addressed in reproductive health.

The overall goal of reproductive health is to create an enabling environment for appropriate action and provide the necessary impetus and guidance to national and local initiatives in all areas of reproductive health. The specific goals are to:

- Achieve healthy sexual development

- Prevent diseases, disabilities and preventive death from sexuality and reproduction related causes
- Minimize impact of reproductive health problems through quality services and appropriate care as may be necessary.
- Ensure freedom from harmful practices

Components of Reproductive health, according to Adesokan (2010) include: 1) safe motherhood, comprising of prenatal care, clean and safe delivery by skilled attendant, emergency obstetric care, post partum care; 2) family planning information and services; 3) prevention and management of consequences of abortions and post abortion care; 4) adolescent reproductive health; 5) prevention and management of sexually transmitted infections including HIV/AIDS; 6)prevention and appropriate management of infertility and sexual dysfunction in both men and women; 7) active discouragement of harmful practices; 8) male involvement and participation in reproductive health issues; 9) cancer of the reproductive tracts in male and female; 10)management of andropause and menopause; 11) gender equity and equality; 12) elimination of harmful practices.

## 2.2 REPRODUCTIVE HEALTH EDUCATION IN NIGERIA

Although we see sexuality around us every day, reproductive health and sexuality education for adolescents remain a controversial issue in Nigeria. Surveys conducted nationally show that parents who ought to be the primary

sexuality educators of their children and communicate to them specific values about sexuality, play the least role in this area. Schools too provide little or no reproductive health and sexuality education for young people, leaving their equally misinformed peers as the primary source of information on these issues (Action Health Incorporated, 1996).

The International Conference on Population and Development (ICPD, 1994) suggests that support should be given to integral sexuality education and services for young people with the support and guidance of their parents and in line with the convention on the rights of the child.

Over the years, there have been initiatives by the Federal Government of Nigeria (FGN), donor agencies and non-governmental organizations (NGO) to address issues of sexuality (National Guidelines Task Force on Sexuality Education, 1996). Government, through the Federal Ministry of Education, parastatals, the Nigerian Educational Research and Development Council (NERDC), has been involved in school-based Population and Family Life Education (POP/FLE) programme, using curriculum and instructional package development as well as teacher training. The Federal Ministry of Health (MOH) has been working to promote the issues through its Department of Community Development and Population Activities, the Health Education Branch, the National AIDS and Sexually Transmitted Diseases (STD) control programme and the Maternal and Child Health Unit. Only recently, the National Council on health approved the Adolescent Health Policy for Nigeria. The Federal Ministry of

Information has also contributed immensely to promoting adolescent health education, especially through the Population Information and communication Branch.

Notable among the United Nations Agencies, bilateral agencies and donor-organizations that have supported the implementation of programmes on these issues in Nigeria are the WHO, UNFPA, UNICEF, UNIFEM, USAID and its sub-contractors.

Non-governmental organizations (NGOs) too have played a major role to complement government efforts. NGOs initiatives aimed at improving adolescent sexual health and development include the programmes of the Planned Parenthood Federation of Nigeria (PPFN) involving advocacy among policy makers, family life education programming within schools and religious organizations and service delivery. Action Health International (AHI) activities directed at raising public awareness and advocating for adolescent sexuality education as well as in-school peer education programming.

However, there is still a wide gap between the information and services the youths ought to have and what is actually delivered to them. Addressing the sexual health needs of youths requires a comprehensive approach beginning with a universal sexuality education that is relevant to their needs. Therefore, a written material detailing standards for providing sexuality education is timely.

## Nigerian guidelines development process

Work on the original United States Guidelines for sexuality education started in 1990 by the Sexuality Information and Education Council of the United States (SIECUS) with the cooperation of a forum composed of professional leaders in the field of health and education, and representatives of national organizations. The American initiative began to address why the abundance sexuality education programmes in the United States existed without the presence of adequate direction and lack of reliable, easily accessible information in this field. The forum of representatives worked extensively in developing multiple revisions of these guidelines resulting in the published document in July 1991.

The seed of the Nigerian project was sown when Action Health Incorporated (AHI) became familiar with this document at a forum sponsored by the McArthur Foundation on Communicating Sexuality Education in Cuernavaca, Mexico, in 1992. AHI believed that this work would be helpful to the Nigerian populace, who share many similar life aspects and deficiencies as people in the United States regarding sexuality information (National Guidelines Task Force, 1996). It however, recognized that there are as many differences between the two cultures as there are commonalities. Therefore, work had to be done to adopt the document to the needs of the Nigerian populace with the objective of producing an authentic Nigerian document.

From 1992, through participation at meetings, seminars and conferences, AHI began advocating the need for a national guideline document for promoting sexuality education in Nigeria. In January 1995, following a professional sexuality educator's training workshop organized by AHI in collaboration with SIECUS and funding from the International Women's health Coalition (IWHC) in Lagos, AHI started a local networking process of soliciting for collaboration between it and other leading non-governmental organizations interested in adolescent reproductive health and sexuality.

By March 1995, a National Advisory Committee had been constituted consisting of the following organizations:

- Action Health Incorporated (AHI)
- Association for Reproductive and Family Health (ARFH)
- National Association of Nigerian Nurses and Midwives (NANNM)
- Nigerian Medical Association (NMA)
- Planned Parenthood Federation of Nigeria (PPFN)
- Society for Women Against AIDS in Nigeria (SWAAN)
- World Health Organization (WHO) Nigeria office.

The committee's mandate was to develop a document outlining guidelines for comprehensive sexuality education in Nigeria, using the United States' guidelines as a working document. The John D and Catherine MacArthur

Foundation financed this collaboration while SIECUS provided the technical assistance needed.

The first adaptation undertaken by the National Advisory Committee involved extensive and detailed revisions of the structure and assumptions of the United States' guidelines based on their understanding of the prevalent needs within the Nigerian socio-cultural setting (with reference to values, attitudes, knowledge, behaviours as well as the disposition of various cultures to sexuality issues in Nigeria). Their work was completed by June 1995.

Because sexuality education is a very controversial issue occasioned by differences based on religious and socio-cultural groupings, provision was made for diverse representation based on these differences and the geographical locations of the NGOs and individuals in the constitution of the second draft.

Early in 1996, Task Force members were again asked to review the changes incorporated into the second draft for comments, evaluation and then give their approval. By June 1996, a final compilation meeting was held to review and harmonize Task Force members. After this meeting, the final draft was completed and the document ready for printing and distribution to the more than 100 organizations working on adolescent health and development issues in Nigeria.

It is understandable that with each revision, new questions will arise and the guidelines will have to be enhanced. This initial resource is a useful tool for educators and those directly or indirectly working with children and adolescents.

It also provides the opportunity to broaden the space and discussion in defence of every child and adolescent's right to be sexually educated, and thus able to envision a better quality of life and health for all citizens.

**Goals and values**

Sexuality education is a lifelong process of acquiring information and forming attitudes, beliefs and values about identity, relationships and intimacy. It encompasses sexual development, reproductive health, interpersonal relationships, affection, intimacy, body image and gender roles. Sexuality education addresses the biological, socio-cultural, psychological and spiritual dimensions of sexuality from the cognitive, affective and behavioral (psycho-motor) domain including the skills to communicate effectively and make responsible decisions (National Guidelines Task Force on Sexuality Education, 1996). The primary goal of sexuality education is the promotion of sexual health.

The Guidelines for comprehensive sexuality education in Nigeria are based on four primary goals for sexuality education:

1) Information – provision of accurate information about human sexuality, including growth and development, human reproduction, anatomy, physiology, masturbation, family life, pregnancy, childbirth, parenthood, sexual response, sexual orientation, contraception, abortion, sexual abuse, HIV/AIDS and other sexually transmitted diseases (STD).

2) Attitudes, values and insights – provision of opportunities for individuals to question, explore and assess their sexual attitudes in order to develop their own values to enhance self-esteem and to develop insights concerning relationships with members of both sexes, and understand their obligations and responsibilities to others.

3) Relationships and interpersonal skills – development of interpersonal skills as well as the ability to create satisfying relationships. Sexuality education programmes should enable individuals to fully understand their sexuality and help them develop the capacity for caring, supportive, non-coercive and mutually pleasurable and sexual relationships.

4) Responsibility – exercise of responsibility regarding sexual relationships including addressing abstinence, how to resist pressures to become prematurely involved in sexual intercourse and encouraging the use of contraception and other sexual health measures. Sexuality education should be a central component of programmes designed to reduce the prevalence of sexually-related medical problems, including teenage pregnancies, sexually transmitted diseases including HIV infection and sexual abuse.

## 2.3 CONTRACEPTIVE TECHNOLOGY

The concept of contraceptive technology is concerned with the application of scientific knowledge in the effective prevention of unintended pregnancies.

When it comes to choosing a contraceptive, service providers and clients alike are usually more interested in effectiveness than in any other single factor. Demographers point out that none of our current techniques of describing contraceptive effectiveness is anywhere near perfect (Hatcher et al, 1990).

It seems clear however, that, a method will be more effective if used correctly and consistently and less effective if used carelessly. Before attempting to tell how effective the method in question is, one should be familiar with the definitions of two types of effectiveness rates: theoretical effectiveness and actual use effectiveness. The theoretical effectiveness of any method is the maximum effectiveness of that method, i.e. its effectiveness, when used without error, when used perfectly, and when used exactly according to instructions. On the other hand, use effectiveness takes into consideration all users of a method, i.e. those who use the method without error and those who are careless.

Therefore, in answering the question, "how effective is each of these methods of birth control?" it is important that one be consistent for all methods. In the light of the fact that there is a difference between theoretical effectiveness and actual use effectiveness; which rate should be quoted? Hatcher et al (1990) suggested that both rates be quoted. However, he was quick to suggest that presenting the theoretical effectiveness of one method followed by the use effectiveness of another method should be avoided.

The "best method" of birth control is often the one that makes a couple feel most natural and most comfortable and that which the couple uses consistently and correctly (Hatcher et al, 1990).

## 2.4 THE MENSTRUAL CYCLE

The provision of contraceptives requires an understanding of the human menstrual cycle. Unlike male fertility which is relatively constant during the reproductive years, female fertility is cyclic; ovulation normally occurs once a month and is regulated by the amount of and interactions among certain hormones present in the reproductive system. Understanding how these hormones relate to the release of an egg from the ovary and to the preparation of the uterus for implantation of a fertilized egg is fundamental to understanding how most methods of contraception work.

### Physiology Of Menstrual Cycle

The normal human menstrual cycle depends on the function of biological feedback among the following anatomical structures; the hypothalamus and the other influences from the central nervous system, the anterior lobe of the pituitary, the ovary and the uterus. The menstrual cycle may be divided into three phases according to the changes occurring in the uterus: (i) the menstrual phase, (ii) the proliferative phase and (iii) the secretory phase. Using the changes occurring in the ovary as a reference, one discovers two phases: (a) the follicular phase, corresponding to the menstrual and proliferative phases in the

uterus and (b) the luteal phase, corresponding to the secretory phase in the uterus.

**The menstrual phase**

The menstrual cycle begins with the menstrual phase, that is, with the first day of the menstrual flow. In an ovulatory cycle, the shedding of the endometrial lining results from declining levels of oestrogen and progesterone in the late secretory phase.

Follicle stimulating hormone (FSH) levels throughout the cycle fluctuate via a negative feedback system involving oestrogen. Luteinizing hormone (LH) levels fluctuate by both positive and negative feedback systems involving oestrogen and by the negative feedback of progesterone during the luteal phase. The low levels of oestrogen at the time of menstruation cause the hypothalamus to produce follicle stimulating hormone – releasing – factor (FSH – RF). At very low levels, oestrogen via a negative feedback mechanism stimulates FSH production. But then, as oestrogens increase and cause a fall in FSH via the negative feedback mechanism, these rising oestrogens cause an increase in LH levels via a positive feedback mechanism. FSH stimulates the growth of several follicles in the ovary. LH is necessary for the initiation of oestrogen secretion by the follicles.

**The proliferative phase**

As a result of increasing levels of oestrogen from the developing follicles, the uterus enters a period of growth called the proflierative phase. In general, this phase begins with the cessation of menstruation and ends with ovulation. This phase is characterized by increasing levels of oestrogen, atrophy of most of the developing follicles, further development of the dominant follicle, endometrial thickening, increase in size of the uterine glands, and proliferation of uterine vessels. While oestrogen concentrations are rising, LH concentrations remain constant and FSH concentration decline steadily. The decrease in FSH is the result of the negative feedback action of oestrogen on the hypothalamic-pituitary axis. The absence of a similar change in LH concentrations probably reflects combined positive and negative feedback effects of oestrogen.

At mid-cycle, the high level of ovarian oestrogen causes a surge of LH release from the pituitary, via positive feedback. This peak of LH production is the most dramatic rise and fall in serum hormone concentrations of any of the pituitary or ovarian hormones and is used in many studies of the menstrual cycle as a point of reference (Hatcher et al, 1990). Thus, ovulation might be timed as 12, 18, 24 or 36 hours "post-LH peak" and the onset of menstruation might be timed as 13, 14 or 15 days "post-LH peak". This LH surge is responsible for three changes, namely: (1) final stage growth and maturation of the follicle, (2) ovulation and (3) formation of the progesterone and oestrogen secreting corpus

luteum from the ruptured follicle. A plasma level of progesterone over 3 nanogram/ml is acceptable as reliable evidence of ovulation.

**The secretory phase**

Ovulation marks the end of the proliferative phase, and the beginning of the secretory phase. The secretory phase is also called progesterone dominated phase. The ruptured follicle post-ovulation still under the influence of LH, changes to become the corpus luteum which begins to produce progesterone while continuing to produce oestrogen. Under its influence the endometrium thickens, the uterine glands branch and the secretory function of these glands begin.

The secretory capacity of the corpus luteum is under the control of LH in the non-pregnant female and human chorionic gonadotropin (HCG) in the pregnant female. If fertilization does not occur, the corpus luteum degenerates rapidly within 9-11 days after ovulation but the exact mechanism of degeneration is not known. When the corpus luteum atrophies oestrogen and progesterone levels fall rapidly. The thickened lining of the uterus can no longer be maintained and is sloughed off through menstrual flow.

The human menstrual cycle has an average length of 28 days. In 90% of all women, the duration of the secretory phase is between 13 and 15 days. Thus, the least variable part of the human cycle is the secretory phase, which is the interval between ovulation and the onset of the next menstrual flow. When a

menstrual cycle is longer or shorter than the expected 28 days, it is almost always the menstrual and proliferative phases that are longer or shorter than average.

## 2.5 HORMONAL CONTRACEPTIVES

It was not until the early 1930s that enough knowledge of the menstrual cycle was pieced together so that couple could understand when during the menstrual cycle; sexual intercourse was most likely to result in fertilization of an egg (Hatcher, et al, 1997). Subsequent research into basic hormonal interrelationships led to attempts to alter these patterns in order to control fertility. In 1934, Corner and Beard isolated and established the structure of progesterone. Then in 1937, Makepeace, working with rabbits, demonstrated that progesterone had the power to inhibit ovulation (Hatcher et al, 1997).

There are three groups of hormonal contraceptives. These include: oral, injectables and implants.

## 2.6 ORAL CONTRACEPTIVES

Progesterone was first isolated from a Mexican yam being studied for the production of steroids including cortisone; ultimately this search for cortisone led to an effective oral contraceptive (Hatcher et al, 1997). Norethindrone, isolated in 1951, was the first orally active progestin followed in 18 months by

norethynodrel, which would be used in the first marketed oral contraceptive (Hatcher et al, 1997).

Oral contraceptives contain either oestrogen and progestin or both, in various doses. Oral contraceptives include combined oral contraceptives (C.O.C) and progestin – only pills.

**Mechanism of action of oestrogen as contraceptive**

Oestrogenic agents may have contraceptive effects by influencing normal pattern of ovulation, ovum transport, implantation or placental attachment.

Ovulation is inhibited via the effect of oestrogen on the hypothalamus and the subsequent suppression of pituitary follicle stimulating hormone (FSH) and luteinizing hormone (LH). Hormonal evidence of inhibition of ovulation by oestrogenic agents includes absence of the mid-cycle surge of oestrogen, lack of mid-cycle peaks of FSH and LH, and the suppression of the normal post-ovulatory increase in serum progesterone and urinary pregnandiol. Ovulation is not always suppressed by combined oral contraceptive agents containing 50mcg or less of oestrogen.

**Implantation:** Implantation of the fertilized egg is inhibited by high doses of oestrogen (diethylstilboestrol, ethinyl destradiol or conjugated oestrogens) administered after an unprotected act of intercourse at mid-cycle. The interval is approximately 6 to 7 days. It has been shown that high doses of oestrogens taken post-coitally have an anti-progestational effect on the uterus,

altering the normal secretory development and causing Areas of marked oedema alternating with the areas of dense cellularity. These changes inhibit implantation.

Ovum transport: It has been shown in animal studies that ovum transport is accelerated by oestrogenic agents (Hatcher et al, 1990).

**Luteolysis**: The degeneration of the corpus luteum, causing the falling of serum progesterone level and hence the prevention of normal implantation; and placental attachment is still another possible effect of high dosages of oestrogens administered post-coitally.

**Mechanism of action of progesterone as contraceptive**

Normally, progesterone (Pro = on behalf of; gestation = pregnancy) prepares the endometrium for implantation and maintains pregnancy. Progestational agents also have several contraceptive effects.

**Hostile cervical mucus**: This is present following treatment with progestins. It hampers the transport of sperm and decreases the ability of the sperm to penetrate the cervical mucus. Hostile cervical mucus is scanty, thick, cellular and exhibits decreased ferning (a microscopic pattern, looking like a feathery leaf called fern) and spinnbarkeit (i.e. ability to stretch a mucus sample before it breaks).

**Capacitation**: This is the activation of the hydrolytic spermatic enzymes that are required for the sperm to penetrate the cells and the macromolecular

investments surrounding the ovum. Capacitation also changes the surface of spermatozoa resulting in decreased stability of the plasma membrane. Capacitation occurs primarily in the uterus and the fallopian tubes but is inhibited under conditions of progesterone dominance. It is doubtful that capacitation can be totally inhibited by progestational compounds (Hatcher et al, 1990). Human sperm after incubation in an appropriate medium are capable of fertilizing an ovum without having passed through cervical secretions, the uterus or the fallopian tubes.

**Ovum transport**: This may decelerate when progestins are taken prior to fertilization. The deceleration of ovum transport might produce two problems in women using progrestins as contraceptives: an increased incidence of ectopic (tubal) implantations; and an increased incidence of partially degenerated ova implanting in the endometrium, resulting in defective fetuses.

**Implantation**: It may be inhibited when progestins are administered prior to ovulation. This is in part, the rationale for adding slowly released progestins to intra-uterine device (IUD). Treatment with progestins alters the FSH and LH peaks enough so that even when ovulation does occur, the decreased progestin production by the corpus luteum leads to inhibition of implantation. Long-term progestin administration systematically leads to a resting atrophic endometrium.

**Ovulation:** Ovulation itself may be inhibited via a subtle disturbance in hypothalamic – pituitary – ovarian function and a modification of the mid-cycle surge of FSH and LH produced by progrestins.

**Combined Oral Contraceptives**

Combined oral contraceptives also called combined pills, oral contraceptives (OC), the pill and birth control pill; contain two hormones similar to the natural hormones in a woman's body – an oestrogen and a progestin.

In the early 1960s, OCs contained 100-150mcg of an oestrogen and 1-10mg of the progestin (Pop Rep 1997). Modern OCs are made from very low doses of synthetic oestrogen and progestin. These are often very effective in preventing pregnancy when taken consistently and correctly.

There are three types of combined pills:

**(i) Low-dose Pills**

These contain the same amount of oestrogen and progestin in each pill. They are also called constant low-dose, and monophasic low-dose pills. The oestrogen in these pills is the ethinyl estradiol. The amount of ethinyl estradiol is usually less than 0.05mg – usually 0.03 or 0.035mg. The other hormone is the progestin. Common progestins are norgestrel, levonorgestrel, and norethindrone acetate and ethynodal diacetate.

**(ii) Standard Dose Pill**

These are also called constant standard dose pills and monophasic standard-dose pills. Like low-dose pills, they contain the same amount of oestrogen and progestin in each pill, but the amount of oestrogen is 0.05mg. The oestrogen is in the form of ethinyl estradiol or mestranol.

The progestin could be in the form of norgestrel, levonorgestrel, and norethindrone acetate and ethynodial diacetate.

**(iii) Triphasic Pills**

These are also called multiphasic pills. They contain low amount of oestrogen. The amount of one or both hormones in each pill of same packet varies during each pill cycle to keep hormone levels low. These variations are usually reflected by three or four different colours of pills in the same packet.

Some clinical trials have observed that triphasic pills produce minimal breakthrough bleeding, spotting and amenorrhea associated with low-dose and standard-dose pills (Apelo and Suplido, 1995; Ellsworth, 1996; Gaspard et al, 1993).

**Indications**

Combined oral contraceptives are indicated for all fecund women of any age, including adolescents and women over 40 years of age, who want an effective method of contraception that is not permanent i.e. for postponing or spacing of births. Also for women who want contraceptive method that requires no action during sex, and women who have history of heavy or painful menstrual periods.

**Contraindications**

The use of COCs, according to WHO medical eligibility criteria 1996 in Hatcher et al (1997) is not recommended for women who smoke cigarettes and are over age 35; have blood pressure over 160/100 mmHg; are breastfeeding a baby less than six months old; have had stroke or problems with heart, or blood vessels due to blockages. It is also not recommended for women who have had breast cancer, active liver disease, headaches with blurred vision, as well as those who might be pregnant, and have unusual vaginal bleeding that suggests disease. Likewise, COC is not recommended for women who have long-term, severe diabetes.

Furthermore, COC may be a poor choice for women who dislike or forget taking pills or who are likely to stop the pill if it makes them nauseated at first, and women who will find it hard to get more pills.

**Procedure for taking the pill**

A woman can begin taking COC on any of the first 7 days after her menstrual bleeding starts if she is cycling normally. The pill is taken one each at the same time everyday until the packet is empty, then another packet is started the next day. If a pill is missed, it is taken immediately as soon as it is remembered. Then the next pill is taken at the regular time, even if it means taking two pills at once or on the same day.

**Effectiveness**

When taken correctly, COCs offer highly effective contraception. The theoretical effectiveness of COC approaches 100%. The second United States Food and Drug Administration (USFDA) report on oral contraceptives quoted a figure of 0.1 pregnancies per 100 women per year (Pop Rep 1997).

The use effectiveness of COCs is difficult to evaluate as it depends on numerous patients and programme variables. Many unwanted pregnancies occur when a woman discontinues her pills, fails to initiate a second method of contraception, and has unprotected intercourse. Reliable sources indicate a failure rate of 10 pregnancies per 100 women, pill users (Hatcher, et al, 1997).

**Side effects**

About 40% of pill users experience side effects of one kind or another (Hatcher et al, 1990). The side effects are divided into three basic groups: (1) Possibly life-threatening, (2) Serious and (3) fairly minor.

**1) Possibly Life-threatening**

Blood clots in the legs, pelvis (lower abdomen), lungs, heart and brain. Signs of serious trouble may be headaches, blurred vision or loss of vision, flashing lights, severe leg pains, severe chest pains or shortness of breath. Risk of heart attack is increased in women over 40 years who smoke.

Rupture of the capsule of the liver, extensive bleeding and even death may be caused by benign tumors of the liver.

Hepatocellular adenomas are rare tumours of the liver which are more likely to occur in long-term pill users, older women and women using high dose pills.

**2) Serious**

Serious side effects include Gall bladder disease with upper abdominal pain, indigestion and the development of gallstones. Hypertension, if high enough, can lead to permanent complications. However, it is usually reversible very quickly.

**3) Fairly Minor**

This includes weight gain, fluid retention, breast fullness and tenderness. Mild headaches, spotting (bleeding) between periods, decreased menstrual flows, missed periods, more problems with yeast infection, vaginal itching or discharge. Depression, mood changes, fatigue, decreased sex drive (libido), acne, chloasma or "mask of pregnancy" (skin darkens on upper lip, under eyes, or on forehead).

## 2.7 PROGESTIN – ONLY ORAL CONTRACEPTIVES

Progestin – only oral contraceptive (POCs) contain very small amount of only one kind of hormone, a progestin. It contains one-half to one-tenth as

much progestin as combined oral contraceptives. They do not contain oestrogen. They are also called progestin-only pills and minipills.

The POC was developed in the early 1970s in response to the reports on oestrogen and thromboembolic disease (Blackburn et al, 2000).

Each progestin – only tablet contains 0.3 to 0.6mg of the norethindrone progestins or else 0.03 to 0.0375mg levonorgestrel. Unlike COCs, POCs are taken continuously with no hormone-free intervals between cycles. POCs have never become widely used. Outside the context of breastfeeding, they are somewhat less effective than combined OCs. Missing progestin-only pills or taking them at differing times of the day may increase the risk of pregnancy more than with COCs.

**Indication for use**

POCs can be used by women of any age including adolescents and those over 40 years of age, particularly, women who are breastfeeding (starting as soon as six weeks after childbirth) can use POCs. Its use is also indicated in women who smoke cigarettes, just had an abortion or miscarriage, iron deficiency anemia, benign breast disease, headaches, varicose veins, valvular heart disease, pelvic inflammatory diseases (PID), schistosomiasis, sexually transmitted diseases, heavy menstrual periods, endometriosis, thyroid disease, benign ovarian tumors, uterine fibroids, epilepsy, tuberculosis (unless taking Rifampicin).

**Contraindications**

POC is contraindicated in women with breast cancer, jaundice, severe liver cirrhosis, hepatitis, deep venous thrombosis. Its use is not recommended in women who are breastfeeding a baby less than six weeks old; or is taking phenytoin, carbamazepine, barbiturates or primidone for seizures or Rifampicin or griseofulvin.

**Procedure for taking P O Cs**

The client should start taking progestin-only contraceptive immediately or in the first 7 days after first or second trimester miscarriage or abortion. For a woman with menstrual cycles, she can start at any time she is reasonably sure she is not pregnant, or in the first 5 days of menstrual bleeding.

The woman should take one pill everyday at the same time each day. When she finishes one packet, she should take the first pill from the next packet on the very next day. There is no wait between packets. If a woman forgets one or more pills, she should take one as soon as she remembers and then keep taking one pill each day as usual. If she is more than 3 hours late taking her pill, she should take the missed pill as soon as she remembers and take the next pill at the usual time of the day.

**Effectiveness**

P O C is very effective when used correctly and consistently. About 0.5 pregnancies per 100 women in the first year of use (1 in every 200). It is more effective in breastfeeding women as breastfeeding itself provides much protection against pregnancy.

**Side effects of P O C**

The POCs have similar side effects with combined oral contraceptives.

## 2.8 INJECTABLE CONTRACEPTIVES

About 12 million couples throughout the world now use injectable contraceptives (Lande, 1995). Although the first injectables were developed soon after oral contraceptives, limited availability has constrained use in all but few countries such as Indonesia and Thailand (Lande, 1995).

Throughout the world, many women value injectables because they are highly effective, long-acting, reversible and convenient, and they can be used privately. Also, breastfeeding women who want to use hormonal contraceptive can use progestin-only injectable.

There are two types of injectable contraceptives: combined injectables and progrestin-only injectables.

### 2.8.1 Combined Injectable Contraceptives

The name combined injectable contraceptives is given to a group of hormonal contraceptives administered by intramuscular injection. The term "combined" indicates that these injectables contain both a progestin and oestrogen.

Research on injectable contraceptives began shortly after the development of oral contraceptives. Researchers developed the first combined injectable contraceptive (CIC) and conducted clinical trials in 1960s (Lande, 1995). Dihydroxy progesterone acetophenide and estradiol enanthate under the brand name decadroxate was originally developed by Squibb Pharmaceutical Company in the 1960s.

At present, there are three main types of CICs in the market, namely, cyclofem, mesigyna and deladroxate. These three formulations provide very effective results in pregnancy protection for a 30-day period. Therefore, they are also referred to as "monthly injectables".

**Cyclofem:** It was previously known as cyclo-provera, and was first tested in 1968 (Newton, 1994). It contains depot medroxyprogesterone acetate (DMPA) 25mg and estradiol cypionate 5mg. The Upjohn Company developed cyclo-provera and turned it over to World health Organization (WHO) in 1984 (Lande, 1995).

Cyclofem is a new product becoming more widely used throughout the world (Lande, 1995). It has some similarities with progestin-only injectables:

contains precisely the same progestin as the two most widely-used progestin-only injectables (Depo-provera and Noristerat), however, the progestin dose received over time is much lower with the cyclofem. Although a basic difference from the progestin-only injectables is the presence of oestrogen in the CICs, the oestrogen was incorporated mostly to improve the control of the menstrual cycle.

**Mesigyna**: Like the cyclofem, mesigyna first tested in 1974, is a new lower dose formulation of combined injectable contraceptives. Mesigyna was developed by WHO. It combines norethisterone enanthate (NET-EN) 50mg, and the oestrogen estradiol valerate 5mg.

Besides the different routes of administration from a safety point of view, the most important difference between CICs and COCs is the presence of a "natural" oestrogen in the CICs versus a 'synthetic" oestrogen in the COCs. It is now recognized that natural oestrogens have very favourable effects on lipid metabolism and cardiovascular function (Lande, 1995).

**Deladroxate**: It is the precursor of many combined injectable contraceptives, currently available. It contains dihydroxy progesterone acetophenide 150mg and estradiol enanthate 10mg. This formulation has twice the oestrogen dosage of the newer CICs. The higher dose has been associated with menstrual irregularities in an average of 22.4% users with a range of 7.5% to 24.4% (WHO, 1993).

**Indications for use**

In general, most women can use combined injectable contraceptives safely and effectively. They can be used by women who are of any age including adolescents and those over 40 years who want a reversible, effective contraceptive method. It is also recommended for women who have heavy menstrual periods, those who have anemia and those who want a private contraceptive method that does not require action during intercourse.

**Contraindications**

The use of combined injectable contraceptives is not recommended for adolescents 16 years and below. Also, it is not recommended for women who are 35 and over who smoke heavily; breastfeeding women, hypertensive (160/100 mmHg) with thromboembolic disorders, ischaemic heart disease, current breast cancer, liver cirrhosis and liver tumors.

**Procedure for combined injectable contraceptive use**

The CICs can be started any time one is reasonably sure the woman is not pregnant. It is given within the first 7 days of the menstrual cycle. The next injection is to be given on the same day each month. The grace period of CICs is officially 3 days. Women who come in after the 3 days grace period should be encouraged to abstain from sexual intercourse or use a back-up method.

## Effectiveness

Monthly injectables are highly effective. In a WHO trial, there were 0.2 per 100 women, pregnancies among mesigyna users and none among cyclofem users (Koetsawang, 1994).

The effectiveness of injectables depends on the timing of first injection, adherence to the injection schedule and the injection technique. In a Thai study, the timing of the first injection made a significant difference in the accidental pregnancy rate. The 3-month pregnancy rate was 0.16 per 100 women receiving their first injection after the eighth day (Gray et al, 1995).

## Side effects

Disruption of regular menstrual bleeding and amenorrhea are the most common side effects of injectables and the main reasons that women discontinue using them (Lande, 1995). Also, most women report weight gain. Far fewer women report a variety of other side effects, for example, headaches, dizziness, abdominal discomfort, acne, and moodiness. These side effects are bothersome for some women, but they are generally not dangerous. Some of these less common side effects are plausible reactions to hormones, while others occur at rates typical of the general population and cannot be clearly attributed to injectables.

### 2.8.2 Progestin-Only Contraceptive Injection

Karl Junkmann and colleagues at the German pharmaceutical firm Schering AG synthesized the first injectable progestins in 1953 (Pop Rep 1997). And in 1957, it developed ethindrone enanthate (NET-EN or Noristerat) the first injectable contraceptive, which is injected every two months (Pop Rep, 1999). The United States pharmaceutical firm Upjohn Company synthesized medroxy progesterone acetate (provera) in the late 1950s (Pop Rep. 1997). Upjohn conducted the first clinical trials of provera in its depot or injectable form – Depot-provera in 1963 (Upjohn Company, 1982). Progestin-only injectable contraceptives contains only one kind of hormone – progestin.

Researchers suspected that oestrogen containing contraceptives caused thromboembolic disease in some users of combined oral contraceptives. These suspicions were later confirmed. Progestin-only contraceptive injections fulfilled many of the goals of researchers who wanted to be able to offer a method that was effective, reversible, did not interfere with lactation or require action at the time of sexual intercourse and could be easily delivered by rural healthcare providers.

Available progestin-only injectables include depot medroxy progesterone acetate (DMPA) and norethindrone enanthate (NET-EN).

**Depot Medroxy Progesterone Acetate (DMPA)**

DMPA is given every 3 months. It contains a progestin, similar to the natural hormone that is synthesized in a woman's body. The hormone is released slowly into the bloodstream. It is also known as Depot-provera, Depo and Megestron.

Tests of DMPA in beagle dogs and monkeys in the early 1970s raised questions about cancer that delayed US Food and Drug Administration (US FDA) approval and held back use in many countries. Beagle dogs developed breast tumors and some monkeys developed endometrial tumors in the tests than required by the US FDA of new hormonal contraceptive (Jordan, 1992). The WHO collaborative study of neoplasia and contraceptives examined the risk of cancer among users of hormonal contraceptives and reached the following conclusions:

Breast cancer: No risk overall

Cervical cancer: No increased risk of invasive cancer

Endometrial cancer: Protective effect

Ovarian cancer: No increased risk.

Liver cancer: No increased risk.

The findings about breast and endometrial cancer were the most crucial because they answered the long standing question raised by animal studies (Jordan, 1992). The WHO study led the US FDA to change its position in 1992 and approved DMPA.

**Indications for use**

DMPA injectable can be used in any circumstances by women who are any age including adolescents and those over 40 years, are breastfeeding, smoke cigarettes; have just had an abortion or miscarriage.

Also recommended for use in women with benign breast disease, mild headaches, mild or moderate blood pressure, iron deficiency anemia, varicose veins, valvular heart disease, irregular menstrual periods, malaria, schistosomiasis, sickle cell disease, thyroid disease, uterine fibroids, epilepsy, tuberculosis.

**Contraindications**

The use of DMPA is contraindicated in unexplained abnormal vaginal bleeding, current breast cancer, and undiagnosed breast lump, women who are breastfeeding less than six weeks post-partum, severe hypertension, severe diabetes, ischaemic heart disease and stroke. DMPA is also not recommended for women with severe recurrent headaches, focal neurologic symptoms, past breast cancer, active viral hepatitis, severe cirrhosis and liver cancer.

**Effectiveness**

Injectable contraceptives combine almost complete effectiveness with reliable reversibility. Most clinical trials report less than 1 pregnancy per 100 women in the first year of use (Bloch, 1971; Brat, 1971).

Women who have used DMPA or NET-EN and stopped to have babies may have to wait several months longer on average for pregnancy than former intra-uterine device (IUD) or oral contraceptive users. Thus, tumours persist that some women who use injectable become sterile. In fact, after two years, pregnancy rates among former DMPA, IUD and oral contraceptive users are the same (Lande, 1995).

**Side effect**

Common side effects include changes in menstrual bleeding such as light spotting or bleeding, heavy bleeding, amenorrhea, weight gain (average of 1 – 2 kg each year), delayed return of fertility, may cause headaches, breast tenderness, moodiness, nausea, hair loss, less sex drive, acne in some women. Long-term effects of hormonal contraceptives seem to slow the accumulation of bone mass in adolescents especially under age 16.

**Norethindrone Enanthate (NET-EN)**

Also known as NET-EN or noristerat, it is the first injectable contraceptive which is injected every two months (Pop Rep, 1997). It contains progestin-only in the form of Norethindrone (norethisterone) enanthate 200mg.

NET-EN share most characteristics with DMPA. However, NET-EN has somewhat less effect on bleeding patterns than DMPA. In a comparative trial,

bleeding episodes in the first six months were significantly shorter among NET-EN users than among DMPA users (WHO, 1983).

### 2.8.3 Implants

Contraceptive implants consist of hormone-filled capsules that are inserted under the skin in the woman's upper arm. The first contraceptive implant system developed was the Norplant system, which consist of six thin, flexible capsules made of silicone. Each capsule is 2.4mm in diameter and 34mm in length and contains 36mg of the progestin levonorgestrel. It contains no oestrogen.

Norplant 2 (also known as Jadelle) is a two-road system that has been currently been approved in various countries for 5 years.

Implants are very effective within 24 hours after insertion and offers pregnancy protection for up to five years. It increases sexual enjoyment because there is no need to do anything at time of sexual intercourse and no need to worry about pregnancy. Implant is a reversible contraceptive with no oestrogen side effects.

**Indications for use**

Norplant implants can be effectively used by women of any age including adolescents and those over 40 years. It is also recommended in breastfeeding woman (starting as soon as 6 weeks after childbirth). Women who smoke, who have just had abortion or miscarriage, can use implants. Other women indicated

in progestin-only contraceptives who want a longer period of contraception can benefit from Norplant implants.

**Contraindications**

The use of Norplant implants is prohibited in women with unexplained abnormal vaginal bleeding, breast cancer, thromboembolic disorders and active liver disease or is taking phenytoin, carbamazepine, barbiturates or primidone for seizures or rifampicin or griseofulvin. It is also contraindicated in women who are already pregnant.

**Effectiveness**

A Norplant implant is very effective with failure rate of 1 pregnancy in every 1000 in the first year of use. Over five years of use, the pregnancy rate increases to about 1 in every 62 (Hatcher et al, 2001).

**Procedure for insertion of norplant**

The insertion of Norplant implant is done by a trained family planning provider. The woman receives an injection of local anesthetic under the skin of her arm to prevent pain. She stays fully awake throughout the procedure.

The health care provider makes a small incision in the skin on the inside of the upper arm. The capsules are inserted just under the skin.

After all six capsules are inserted; the health care provider closes the incision with an adhesive bandage. No stitches are needed. The incision is covered with a dry cloth and wrapped with gauze.

Insertion takes about ten minutes. Slight bleeding at the insertion site is normal and common during the first few days after insertion.

**Procedure for removal**

Removal of Norplant implant is done by the health care provider. An injection of local anesthetic is given to the woman to prevent pain in her arm. A small incision is made where the capsules were inserted. An instrument may be used to help pull the capsules from under the skin.

The incision is closed and bandaged. Stitches are not needed. Removal usually takes about 15 minutes or longer to accomplish. If a woman wants to continue using Norplant implants, the new capsules are placed elsewhere in the same arm or in the other arm.

**Side effects**

Common side effects include changes in menstrual bleeding such as light spotting or bleeding between monthly periods, prolonged bleeding or amenorrhea. Some women have headaches, enlargement of ovaries or ovarian cysts enlargement, dizziness, breast tenderness or discharge, nervousness, nausea, acne or skin rash, change in appetite, weight gain, hair loss or more hair on the face. Most women do not experience any of these side effects, and most side effects go away without treatment within the first year of insertion. In the very rare instances when pregnancy occurs, as many as one in every six pregnancies is ectopic.

### 2.8.4 Intra-Uterine Devices

Intra-uterine contraceptive devices (IUDs) are small flexible devices made of plastic that prevent pregnancy when inserted into a woman's uterus through her vaginal cavity. The most widely used IUDs have copper or copper sleeves on it. Inert (unmedicsated) and progestin-releasing (levonorgestrel or progesterone) IUDs are less widely available. IUDs are a safe and effective method of reversible, long-term contraception for most women. They do not affect breastfeeding, interfere with intercourse or have hormonal side effects.

The first modern IUDs are the Lippes Loop and the Marguilies Spiral. They appeared in the early 1960s. They were made of polyethylene, a biologically inert plastic (Guttmacher, 1995). In the late 1960s, researchers discovered that adding copper to a plastic IUD frame increased effectiveness, thus allowing sizes smaller than the all-plastic devices. The first copper IUDs include the coper-7 (Cu-7) and TCU-200. They proved to cause fewer side effects such as pain and bleeding. They were just effective in preventing pregnancy, however (Zipper et al, 1969). It was thought that these IUDs would have to be replaced every few years. Therefore a second generation of copper IUDs was developed, including the TCU-e3804, the TCU-2206, the Nova T, the multiload-375 (MLCU-375) and others. These IUDs last longer and are even more effective. IUDs that release a hormone in the uterus also were developed in the 1970s (Luukkainen, 1994).

## Mechanism of action

IUDs work chiefly by preventing sperm and egg from meeting. Several mechanisms of action of IUDs have been suggested (Hatcher et al, 1980). IUDs increase motility of ovum in fallopian tube, thereby propelling it into the uterus before the sperm could fertilize it. Local foreign body inflammatory response is initiated by presence of IUDs in the uterus causing lysis of the blastocyst and prevention of implantation.

Perhaps, the IUD immobilizes the sperm by making it hard to move through the woman's reproductive tract. Possibly, also, IUD prevents implantation due to increased local production of prostaglandins, associated with the presence of the IUD (Hatcher 1990).

Competition of copper with zinc, in copper bearing IUDs inhibits carbonic anhydrase and possibly alkaline phosphatase activity. Copper may also interfere with oestrogen uptake and its intracellular effects on the endometrium.

Finally, according to Hatcher et al (1990), mechanical dislodgement of the implanted blastocyst from endometrium could be affected by the presence of IUD in the uterus.

## Types of IUDS

Intra-uterine devices can be classified as either:

1. Medicated – i.e. copper-bearing or hormone-releasing.
2. Unmedicated or inert.

Medicated IUDs: They have either copper or hormones added to their plastic frame. The first generation of copper IUDs, which included the copper-T (Cu-T), the TCU-200 and the multiload (MLCU-250), carried copper wire with a surface area of 200-250mm$^2$.

The second generation of copper IUDs introduced several innovation – more copper wires, copper sleeves, and/or a silver core to copper wire (denoted by Ag in the IUD name). These changes increase effectiveness and extend effective lifespan. The major second generation IUDs are the TCU-380A, TCU-220c, Nove-T and multiload-375 (MLCU-375).

Hormone-releasing IUDs constantly release small amounts of steroid hormone into the uterus. The progestasert, which has been introduced since 1976, contains 38mg of progesterone released at a rate 65 micrograms per day for one year. The LNG-20 IUD contains 52mg of levonorgestrel released at a rate of 20 micrograms per day and lasts for at least five years (Luukkainen and Toivonen, 1995).

Unmedicated IUDs: The Lippers Loop, which is made of polyethylene, was the most widely used unmedicated IUD outside China. This IUD is no longer distributed internationally. The other major types of unmedicated IUDs are flexible stainless steel rings either round or in the shape of the uterine cavity and made with a single or double coil. These rings have been widely used in China also, but not elsewhere (Population Reports 1996).

**Indications for use**

Many women can use IUDs safely and effectively. IUDs can be used by women who want long-lasting, very effective and reversible method with little upkeep. It can also be used by women who smoke cigarettes, who have just had an abortion or miscarriage with no evidence of infection or risk of infection. It is also recommended for women with heart disease, high blood pressure, blood clotting problems diabetes, malaria, thyroid disease and epilepsy.

**Contraindications**

The use of IUDs is absolutely contraindicated in active, acute or sub acute pelvic infection, including known or suspected gonorrhea. IUD is also not recommended in pregnancy.

IUDs should not be used in clients with recent or recurrent pelvic infection, history of ectopic pregnancy, abnormal Pap smear, impaired access to emergency therapy. Other conditions that relatively contraindicate IUD use include, cervical stenosis, endometriosis, bicornuate uterus, severe dysmenorrhea, severe menorrhagia, and anemia, allergy to copper, multiple sex partners, anemia and abnormal uterine bleeding.

**Effectiveness**

The IUD is one of the most effective methods of contraception. With most devices, pregnancy rates range from less than one to three per 100 women

per year. Among the widely used copper IUDs, three are most effective – the TCU-380A, TCU-220C and MLCU-375, with the TCU-380A being the most effective of them. Pregnancy rates for all major IUDs are less than one per 100 women per year.

**Procedure for inserting the IUD**

Insertion differs slightly for the various IUDs depending on the size and shape of the IUD, the inserter barrel and plunger, IUD packaging and strings (Population Reports, 1996).

Proper infection-prevention procedures are strictly observed. The IUD insertion is done by trained family planning service provider.

After a careful pelvic speculum and bi-manual examination, and after checking the position of the uterus to make sure that the woman can use an IUD safely and effectively, the vagina and cervix are cleaned several times with an antiseptic solution. The provider inserts the IUD slowly and gently following the manufacturer's instructions.

After the insertion, the client is asked if she feels dizzy and is allowed to lie quietly for 5 to 10 minutes.

**Removing the IUD**

Removing an IUD is usually simple (Hatcher et al, 1997). It can be done anytime by the service provider throughout the menstrual cycle. Removal may be somewhat easier during menstruation when the cervix is dilated.

Proper infection-prevention techniques are strictly adhered to. The health care provider pulls the IUD strings slowly and gently with forceps. If removal is not easy, uterine sound may be used to dilate the cervix.

**Side effects**

Increased menstrual bleeding, often with pain, is the most common medical reason for removing IUDs and most common problem of IUD use. Older women and women with children generally have lower rates of removal due to bleeding and pain (Sivin and Stern, 1979). Pain and cramping may occur at the time of IUD insertion, inter-menstrually, at the time of menses, for the duration of IUD use, or in association with pelvic inflammatory disease (PID) or IUD expulsion (Hatcher et al, 1980). IUD users spontaneously expel their IUD within the first year (Population Reports, 1996).

The symptoms of IUD expulsion may include unusual vaginal discharge, cramping or pain, inter-menstrual spotting, post-coital spotting, dyspareunia, lengthening of the IUD strings, ability to feel the hard IUD at the cervical OS or in the vagina or passage of the IUD itself from the vaginal.

Perforation of the uterus occurs when the IUD, the inserter tube, the uterine sound, or another gynecological instrument used during insertion pierces

the uterine muscle wall (Cole et al, 1985). Perforations may be partial, with just part of the IUD piercing the uterine wall or cervix or complete with the IUD passing through the uterine wall into the abdominal cavity. Also, over time, IUDs may become embedded in the uterine wall without perforating it (Burnhill, 1985).

IUDs protect against intrauterine pregnancies better than ectopic pregnancies. Thus, when an IUD user becomes pregnant, the pregnancy is likely to be ectopic than a pregnancy in another woman (Tatum and Schmidt, 1977).

Pelvic inflammatory diseases are the most serious complications related to IUD use accounting for a majority of IUD-related deaths and hospitalizations (Hatcher et al, 1980).

### 2.8.5 Barrier method and Spermicidals

Barrier methods are contraceptive methods that act as a barrier to the transmission of semen into vagina or uterus thereby blocking the occurrence of fertilization.

Spermicides are chemical agents used during sexual intercourse to immobilize or kill sperm cells thereby making them unable to fertilizer the female egg(ovum).

Barrier methods include condoms, cervical cap, diaphragm, etc.

**Condom**

Condom provides a mechanical barrier to the transmission of semen into the vagina. Mechanical barriers covering the penis have been used for centuries

for protection against pregnancy and infection and for decoration as far back as 1350 BC when Egyptian men wore decorative covers for their penises (Hatcher et al, 1987).

With the advent of vulcanized rubber in the 1840s, came mass production of condoms from synthetic materials. Condoms are rubber or processed collagenous tissue-sheaths that fit over the erect penis.

Among people who use condoms consistently and correctly pregnancy rates are fairly low – about 3 pregnancies per 100 women in the first year of use (Trussel, and Kowal, 1998). Typical use effectiveness varies greatly in various studies and among groups within studies. For example, Demographic and Health Surveys (DHS) data suggest pregnancy rates of over 16 per 100 in the first year of condom use in Egypt, almost 6 in Indonesia, and over 8 in Thailand (Ali and Cleland, 1995). The estimated typical pregnancy rate among condom users in the United States of America (USA) is about 14 per 100 women (Trussel, 1998).

Although not providing perfectly "safe sex", condoms substantially reduce the risk of individual infection (Gardener, 1999). Laboratory tests show that no sexually transmitted infections (STIs), including HIV, can penetrate an intact latex condom (Conant et al, 1986; Feldbum, 1998; Katznelson et al, 1984). Infectious organisms can sometimes pass through condoms made from lamb's intestine, often called natural skin condoms, so they are effective only for contraception, not infection prevention (Cates and Stone, 1992).

The most convincing evidence of condom effectiveness comes from studies of HIV discordant couples – couples whose one partner is infected with HIV and the other is not. Studies of such couples have found low risks of HIV infection among consistent condom users (Allen et al, 1992).

Some men cannot retain an erection if a condom is used. This condition may contraindicate condom use. In some rare cases, men or women have been allergic to the rubber in condoms.

**Procedure for condom use**

The condom sheath should be put on the erect penis before the penis touches the vagina. The pack containing the condom is opened by tearing from a ribbed edge. The condom is held so that the rolled rim is facing up, away from the penis. The foreskin is pulled back if the penis is uncircumcised. The condom is then placed on the tip of the penis, and unrolled all the way to the base of the penis.

Water-based lubricant such as spermicides, glycerine, and water should be used to keep condoms from tearing during sex. Cooking oil, baby oil, coconut oil, mineral oil, petroleum jelly (Vaseline), skin lotions, butter or margarine should not be used as most of them damage condoms.

After ejaculation, the rim of the condom is held to the base of the penis so it will not slip off. The man should pull his penis out of the vagina before completely losing his erection.

The condom is taken off the penis without spilling semen on the vaginal opening. The condom is disposed of by burning, burying, throwing in pit latrine or flushing in a WC toilet.

**The female condom**

The only female condom available today is manufactured by the Female Health Company (Food and Drug Administration (FDA) 1993). Approved in 1993 by the US FDA, the Female Health Company product is called the Reality condom in the USA and other names elsewhere including Femidom and Care contraceptive sheath. Another female condom is currently being developed by Medtech Company (AIDSCAP, 1997).

A variation of female condom is the Janesway female condom, a cotton panty that has a latex pouch built into its crotch. The panty covers the entire external female genital area and is intended to prevent any exchange of fluids or touching of genital areas between partners (Hunnicutt, 1997).

The Reality female condom is made of polyurethane. It is a soft, thin, loose pouch with two flexible rings, one at either end. The ring at the closed end is used to insert the condom into the vagina and hold it in place. The outer ring stays outside the vagina and covers part of the external genitals (Family Health International, 1998). Although designed for use by women, the female condom has also been used by men having sex with men (Buchanan, 1998).

In laboratory tests polyurethane female condoms have proved to be impermeable to sperm and to infectious organisms including HIV (Musaba et al, 1998). Although data from clinical studies on both efficacy and disease-prevention are few, contraceptive effectiveness and disease prevention rates seem comparable to those for male condoms (French et al, 1998).

**New condoms for men**

Male condoms are now being made from plastics as well as latex and in new designs. These condoms are intended to be easier to use and more comfortable and pleasurable (Gardener, 1999).

The new plastic condoms are approximately the same thickness as latex condoms (Free, 1999), are less constricting, not harmed by oil-based lubricants and do not cause allergic reactions (Stone, 1998). They deteriorate more slowly than latex condoms, although if latex are packed in laminated foil; they also are very stable (Free, 1999).

By early 1999, the US FDA had approved eight synthetic male condoms as well as the one synthetic female condom. Of the plastic condoms approved by US FDA, two are the Avanti condom, four are Tactylon brands (Styrene-based plastics) and two are Trojan brands (Kuchinski, 1999).

The Ezon polyurethane condom, developed by Family health International was introduced in several European markets in 1998 (Kaiser Family Foundation (KFF), 1999), but is not yet available elsewhere nor is it approved in USA. Two very thin plastic condoms, the Unique for males, and the Unisex for males and

females are available in Columbia and elsewhere in South America (Free, 1999). Also, Gilmore (1998) stated that a plastic condom by Ortho-Mcneil pharmaceutical of Canada is under development.

Variation in materials apart, condom manufacturers have lately been producing new models – the first variations in designs of the latex male condoms, have come out with the Extra Pleasure brand, which has an enlarged bulb-like area at the head of the condom (Angel, 1999). A sensicon condom made of tactylon plastic also has a "baggy" design that is "bi-directional," meaning that it unrolls in both directions and also can be pulled on rather than unrolled. Other manufacturers are also introducing variations in the condoms. Also available are condoms with various combinations of exotic tastes, smells and/or colours (Condomania, 1999). These do not necessarily meet manufacturing standard and are not tested accordingly (Usher, 1999).

### 2.8.6 Diaphragm

The diaphragm is a dome-shaped rubber cup with a flexible rim. It is inserted into the vagina prior to intercourse so that the posterior rim rests in the posterior fornix and the anterior rim fits snugly behind the pubic bone. The dome of the diaphragm covers the cervix and spermicide cream or jelly, placed in the dome before insertion. It is held in contact with the surface of the cervix. The contraceptive effect of the diaphragm depends partly on its function as a barrier, decreasing the degree of contact between semen and the cervix and

partly on its function as a spermicide holder. For satisfactory effectiveness, the use of a spermicidal agent inside the diaphragm is essential.

An overall effectiveness rate of 98% was documented in 1976 by Marry Lane for diaphragm users at the Sanger Bureau in New York (Lane et al, 1976). This study involving 2175 women followed for two years, is the largest recent study of diaphragm effectiveness reported (Hatcher et al, 1980). Other researchers have reported a wide range of accidental pregnancy rates, representative of which are Vessey's and Wiggin's (1974) - 2.4 pregnancies per 100 women and Hall's (1973) - 7.7 pregnancies. Boulier et al (1977) cited a failure rate among diaphragm users of 17 pregnancies per 100 women per year; this rate represents an extended use effectiveness rates reported in older studies.

**Types of diaphragm**

Diaphragms are available in a range of sizes (numbers corresponding to the rim diameter in millimeters) and in three rim styles. These differ in the inner construction of the circular metal rim as follows:

Flat spring rim: it is a thin, delicate rim with gentle spring strength. Women with very firm vaginal muscle tone (nulliparous) and/or a shallow notch behind the pubic bone arch may find the flat spring more comfortable than the other types. The flat spring folds flat for insertion. Example of flat spring rim is the forth-white diaphragm, sizes 55-95 latex.

Coil spring rim: It is a sturdy rim with firm spring strength. Most women with average vaginal muscle tone and average pubic arch notch find the coil spring comfortable. It folds flat for insertion and can be used with a plastic introducer. Examples include Koromex diaphragm, sizes 50-105, latex; Ramses flexible cushioned diaphragm (coil spring), sizes 50-95, gum rubber.

Arcing spring rim: It has a very sturdy rim with firm spring strength. Most women are able to use the arcing rim comfortably and may find that its arc shape when folded facilitates correct insertion. The arcing rim can often be retained comfortably despite conditions such as rectocele and/or cystocele or lax vaginal muscle tone. Koroflex diaphragm sizes 60-95, latex; Allflex diaphragm sizes 55-95, latex; and Ramses Bendex diaphragm, sizes 65-95, gum rubber are examples of arcing spring rim diaphragm.

A woman with a retroverted uterus or a very long firm nulliparous cervix may find that correct insertion of an arcing spring diaphragm is significantly easier than is insertion of a coil or flat spring type (Hatcher et al, 1980). Many clinicians choose an arcing style for most patients and reserve the coil or flat spring types for women with exceptionally firm vaginal tone or those who do not find the arcing style comfortable.

**Inserting the diaphragm**

The woman inserts the diaphragm with spermicide in the proper position in the vagina before having sexual intercourse. This can be done with one foot

propped up (on the edge of a bed, bathtub or toilet), squatting or lying on her back.

The woman holds the diaphragm with the dome down (like a cup). She squeezes about a tablespoon of spermicidal cream or jelly into the cup of the diaphragm and around the rim. She presses opposite sides around the rim together and, with dome side toward the palm of her hand so that the diaphragm folds. The lips of the vagina are spread with the other hand. The diaphragm is then inserted into the vaginal canal. The diaphragm is pushed into the vagina as far as it goes. With a finger, she touches the diaphragm to make sure that it covers the cervix. Through the dome of the diaphragm, the cervix feels like the tip of the nose.

For each additional act of intercourse, the woman uses an applicator to insert additional spermicide in front of the diaphragm.

**Removing the diaphragm**

The diaphragm should not be removed until 6-8 hours after the man's last ejaculation. Douching should also not be done during that time. Diaphragm should be removed within 24 hours of intercourse.

The woman inserts a finger into the vagina until she feels the rim of the diaphragm. Gently, the finger is slided under the rim and pulled down and out. This is carefully done to avoid tearing it with fingernail. The diaphragm is then washed with mild soap and clean water after each use, and checked for holes by

filling it with water. It is then dried with towel and stored in a clean, dark, cool place.

**The Cervical Cap**

The cervical cap is a thimble-shaped cup (a miniature diaphragm with a tall dome) which fits over the cervix and is held in place by suction between its firm, flexible rim and the surface of the cervix or cervical – vaginal junction. Cervical caps developed and popularized 20-40 years ago were constructed of silver or gold (or more recently, impermeable plastic), and were left in place for as long as three to four weeks (Pop Report, 1996).

There are no cervical caps marketed for contraceptive use in the United States. An impermeable plastic (form) cap, intended for artificial insemination is available and has been used for contraception on a very limited basis by some clinicians (Hatcher et al, 1980). More commonly are soft rubber caps, in manufactured in England for contraceptive use. Very limited anecdotal experience indicates that some women find the firm plastic cap to be uncomfortable (or a cause of partner discomfort). Soft rubber caps, on the other hand, are not suitable for prolonged vaginal retention because of problems with a potent odour after 24-36 hours in the vagina. Manufacturers' recommendations that accompany the rubber cervical caps suggest use of spermicide inside the cap (to fill one-third of the cup) and set time rules for insertion and removal; almost identical recommendations for use of the diaphragm with spermicide.

Information on its contraceptive effectiveness is very limited. The one study reported in the American literature involved 143 patients using a plastic cervical cap left in place for as long as four weeks. In this study, the overall effectiveness rate for the cap was 92.4 per 100 women per year.

Because the effectiveness is not well documented and appears to be lower than that of diaphragm and because the rubber caps currently available involve insertion and removal procedures similar to those for a diaphragm, the primary usefulness of cervical cap is for woman who want to use a method like the diaphragm but for whom the diaphragm fitting is unsuccessful. The cervical cap may be optimal for a woman with very lax vagina tone or marked cystocele or rectocele who is unable to retain a diaphragm, or for a woman who has pressure symptoms or recurrent urinary tract infections with the diaphragm.

Cervical cap fitting is empirical, as with diaphragm fitting. A cap which fits snugly enough to maintain suction contact between the cap rim and the cervix or vaginal vault is chosen by trying the various sizes available.

**Types of cervical caps**

Some of the cervical caps include:

**"Prentif" cavity-rim cervical cap** – it is a deep soft rubber cap with a firm rim and a groove along the inner circumference of the rim to provide good suction. Internal diameter ranges between 22mm to 31mm. This can be fitted even when the cervix is quite long.

**Vimule cap**: is a shallower soft rubber cup that clings to the vagina vault rather than the cervix itself. It has an outer diameter range of 42mm to 54mm. It is useful for women with a very shallow cervix or cervical scarring.

**Milex sperm cap** – the internal diameter range is between 28mm and 38mm. It is a very firm, impermeable plastic cup.

**Contraindications and side effects**

The use of diaphragm and cervical cap is not recommended until 6-12 weeks after childbirth, induced or spontaneous second trimester abortion depending on when the uterus and cervix return to normal. Also not recommended in conditions of allergy to latex, and toxic shock syndrome – a rare but serious illness caused by bacteria characterized by sudden high fever, body rash like sunburn, vomiting, diarrhea, dizziness, sore throat and muscle aches.

Occasionally, a patient or her partner will find the spermicidal cream or jelly used with the diaphragm and cervical cap irritating. Allergy to latex, though very rare, may necessitate discontinuation. Pelvic cramps, urinary retention, bladder symptoms, or aggravation of recurrent bladder or urinary tract infection may also occur with the diaphragm or cervical cap use.

Foul smelling, profuse vaginal discharge may occur as it would with foreign body in the vagina, if the diaphragm or cap is forgotten or left in place for too long.

## 2.9 SPERMICIDES

Spermicides are chemical agents used during sexual intercourse to destroy or immobilize sperm making them unable to move towards the female egg (ovum). They have been available for more than 40 years, and the rigorous contraceptive testing required by the US FDA was not required at the time of their approval (FHI, 2000).

The main chemicals used in spermicides are nonoxynol-9, octokynol-menfegol, and benzalkonium chloride. Of these, nonoxynol-9 is the most common. Spermicides often are used as a temporary method while waiting for a long-term method or by couples who have intercourse infrequently. Many breastfeeding women who use contraception use spermicide since they increase vaginal lubrication and can be used immediately after childbirth and have no hormonal side effects.

Spermicides come in several different forms – cream, jelly (gels), melting suppository, foaming tablet, aerosol foam, and c-film. Some condoms also come lubricated with spermicide. When used alone, spermicides provide some contraceptive protection, but are best used with a barrier method to prevent pregnancy.

Recent research on the effects of nonoxynol-9 (N-9) has led to a rethinking of policy and recommendations around use of spermicidally coated condoms for HIV prevention (AGI, 2002). A recent Cochrane Review of 10 high-quality randomized controlled trials shows that N-9 provides no protection

against sexually transmitted infections (STI). Additionally, these trials suggest that use of N-9 is associated with an increased risk of genital ulceration when compared with a placebo. However, as most of these trials were conduced with high-risk female sex worker population working in high STI prevalence areas and with high rates of partner change, these results are not yet generalizable to lower risk of women using N-9 occasionally as a spermicide (Wilkinson et al, 2002).

**Effectiveness**

Research on the effectiveness of spermicides have shown 20-25% typical use failure rate in the first year of use (Pop Rep. 1996). Efficacy is improved if spermicides are used in conjunction with mechanical barrier methods, most commonly, condom, diaphragm and cervical cap.

**Insertion of spermicide**

Spermicide is inserted into the vagina before each time she has sexual intercourse. In the case of foam or cream, less than one hour before sex, the foam or cream is squeezed from the can or tube into a plastic applicator deep into the vagina and the plunger pushed, to deposit the foam or cream.

Tablets, suppositories or C-films are also inserted into the vagina less than one hour but more than 10 minutes before sex. Applicator or fingers can be

used for insertion. C-film must be folded in half and inserted with dry finger near the cervix or else the film will stick to the fingers and not the cervix.

It is important to note that the woman must use the spermicide each time she has sexual intercourse; and before each additional act of sexual intercourse. Also, she must not douche for at least six hours after sex.

Most spermicides should be stored in a cool, dry place to avoid melting.

**Side effects**

Spermicides may cause irritation to woman or her partner, especially if used several times a day. They may rarely cause local allergic reaction in the woman or her partner. Occasionally, spermicides can make urinary tract infections more common.

### 2.9.1 Sterilization

Sterilization is a permanent method of contraception. It entails surgical operation whereby parts of the reproductive organs are closed so that sperm cannot reach the egg and pregnancy cannot occur.

**Female sterilization**

Surgical sterilization is a very effective way to achieve permanent infertility (Family Health International (FHI), Fall, 1996). In women, the process is often referred to as "tying the tubes", but in actuality, the fallopian tubes may be tied,

cut, clamped or blocked (Hatcher et al, 1980). This serves to prevent sperm from joining the unfertilized egg.

Sterilization provides highly effective protection against pregnancy for the remainder of the woman's reproductive years. It does not decrease a woman's sexual pleasure. It is the most preferred method for women who have completed their families and who do not want children.

Sterilization does not affect feminity. It is also unlikely that it will affect the sexual organs or sexuality. No organs or glands are still being produced. Also, it does not interfere with monthly menstrual cycle pattern.

Female sterilization also offers another substantial health benefit which is protection against ovarian cancer. One large-scale prospective study that followed more than 396,000 women for nine years found that women with tubal ligations had 30 percent less risk of developing ovarian cancer than women who were not sterilized (Miracle McMahill et al, 1997).

**Sterilization methods**

Sterilizations are done in hospitals or in clinics with surgical units. They are done under local or general anesthesia. Closing the tubes for sterilization can be done in several ways. Sometimes the tubes are closed off by tying and cutting (tubal ligation), sealing (cautering), or applying chips, clamps, or rings. Sometimes a small piece of the tube is removed. A woman's health condition may indicate which procedure is better or suited for her.

There are basically two types of sterilization methods: (1) tubal and (2) hysterectomy.

**(i) Tubal Methods**

(a) Abdominal procedures

(i) Laparoscopy - Is one of the two most common methods of sterilization. First, the abdomen is inflated with an injection of harmless gas (carbon dioxide). This allows the organs to be seen clearly. Then the surgeon makes a small incision near the navel and inserts a laparoscope (a rod-like instrument with a light source and a viewing lens) for locating tubes. The surgeon also may insert an instrument for closing the tubes, usually through a second small opening. Sometimes only one incision and one instrument are used.

The procedure takes 20 to 30 minutes. Very little scarring occurs. Women often go home the same day. They may have sexual intercourse as soon as they feel comfortable about it. Injury to the bowel or internal bleeding occurs in five out of 1000 cases.

(ii) Mini-laparatomy – Is another common method of sterilization. It is often performed after childbirth. No gas or visualizing instrument is used in mini-laparatomy. A small incision is made in the lower abdomen, just above the pubic hair. If the operation takes place within 48 hours of delivery, the incision is made just below the navel. The surgeon locates the tubes, then ties, clips or uses electrocautery to block them off. The incision is then closed. Women usually recover in a few days.

(iii) Laparatomy – Is a major surgery and less commonly used than mini-laparatomy and laparoscopy. The surgeon makes a two-to-five inch incision in the abdomen. The surgeon locates and closes off the tubes. The operation requires general or spinal anesthesia. A woman may need to be hospitalized for two to four days. It may take several weeks at home for her to completely recover. If the procedure is done after delivery, the woman's hospital stay may be extended by one or two days. When to resume sexual intercourse depends on the rate of recovery.

(b) Vaginal Procedures

Vaginal procedures are not performed very frequently. There are fewer surgeons trained in the procedure.

(i) Culdoscopy – the surgeon makes an incision in the vagina. No visualizing instrument is used. The tubes are located, brought into view, closed off, and then returned to their normal position.

(ii) Colpotomy - In colpotomy, the surgeon makes an incision in the vagina. No visualizing instrument is used. The tubes are located, brought into view, closed off, and returned to their normal position.

Culdoscopy and colpotomy take 15 to 30 minutes. Women usually go home the same day. It may take a few days at home to recuperate. Sexual intercourse is usually postponed until the incision is completely healed, as advised by the doctor. This may take several weeks. There are no visible

scars. However, there may be more risk of serious infection than with other procedures.

### (2) Hysterectomy

Hysterectomy is the surgical removal of the uterus (womb). It is a major surgery and is not usually used for sterilization. It is used to correct significant medical conditions. Hysterectomy ends menstruation as well as the possibility of pregnancy. It does not necessarily affect the fallopian tubes. However, some medical conditions also call for the removal of a tube and/or ovary, on one side or both.

Hysterectomy is performed through the abdomen or vagina. Sometimes a combined approach is used. Women need to spend several days in the hospital. They usually spend several weeks at home recuperating. They usually abstain from sexual intercourse for four to six weeks as may be advised by the doctor. Complications after hysterectomy occur in 10 to 20 percent of cases (FHI, Fall, 1996).

### Complications of sterilization

Complication can occur with any kind of surgery. Because hysterectomy is usually performed in conjunction with a significant medical condition, the risk of death is much greater than it is for tubal sterilization (www.fhi.org.2003). The

common complications that can occur during or after sterilization are: bleeding, infection and reaction to the anesthetic agent used.

With thorough aseptic technique, infection is rare. But it occurs more frequently after sterilization performed through the vagina. The risk of unintended injury to nearby organs is very likely, as with all surgery. Bowel injury is one of the serious complications, since injuring the bowel allows bacteria to enter the abdominal cavity, causing severe peritonitis.

Other injuries that can occur during female sterilization are perforation of the uterus or the accidental cutting of a major vessel. If severed, the vessel can cause internal bleeding leading to shock or death.

**Effectiveness of female sterilization**

While female sterilization is generally very effective, a few sterilization clients experience unintended pregnancies.

Scientists once thought that risk of pregnancy virtually disappears within a year of sterilization, but a recent study sponsored by the United States Centre for Disease Control and Prevention (CDC) shows that risk of pregnancy continues for years. The combined 10-year pregnancy rate for various methods of tubal occlusion used by 10,685 women in the United States was 1.8 pregnancies per 100 women (Peterson et al, 1996) comparable to the 10-year pregnancy rate for the cupper T MD of 2.0 pregnancies per 100 women (WHO, 1995).

However, long-term effectiveness differs among specific categories of sterilized women. For woman of 34 years and older, sterilization is one of the most effective of all contraceptive methods, with 0.7 percent failure rate over 10 years. But younger women, ages 18 to 33, have more than three times that pregnancy risk at 2.6 percent over 10 years of use (Peterson et al, 1996).

**Male sterilization**

Male sterilization, also called vasectomy, is a permanent contraceptive method for men who do not want more children. The method requires a simple surgical procedure and is performed under local anesthesia. Male sterilization is not castration, as it does not affect the testes. The method does not interfere with intercourse or affect a man's sexual ability.

Vasectomy is a very effective way to achieve permanent infertility. It involves severing the vas deferens (the tubes which deliver the sperm from the testes to the penis) through an incision in the scrotum. This procedure usually takes less than thirty minutes. Recovery may involve some pain or discomfort and scrotal discolouring for several days after the operation.

The operation is not effective immediately. It may take several months (15 to 20 ejaculations) before the sperm is cleared from the tubes. Reversals are difficult, expensive and results are not guaranteed.

Vasectomy has a failure rate of only 0.2% unplanned pregnancies resulting after vasectomy can occur due to surgical error, because the man had an

extra set of vas deferens or even rarely spontaneous regeneration of the vas.

### Complications

No major long-term clinical side effects of male sterilization have been demonstrated, although millions of vasectomies have been performed in both developed and developing countries (Hatcher et al, 1990).

The complication rates for vasectomy are very low in comparison with other contraceptive methods. Most of the common complaints are short time and minor. The most common of these side effects are haematoma, infection, epidydimitis and granuloma (Hatcher, 1990)

## 2.10 NATURAL FAMILY PLANNING

Natural Family Planning (NFP) or fertility awareness refers to a variety of methods used to prevent or plan pregnancy based on identifying a woman's fertile days. For all natural methods, abstinence or avoiding unprotected intercourse during the fertile days is what prevents pregnancy.

Fertility awareness has been used successfully since the 1930s to predict a woman's fertile days. These methods are based on the fact that fertilization is most likely to occur around the time of ovulation. Intercourse is avoided during those times when a woman is fertile, thus preventing contraception. Fertility awareness methods are the only methods of birth control which require the co-operation of both partners.

**Physiological basis for natural methods**

Natural methods of family planning use one or more indicators to identify the beginning and end of the fertile time during the menstrual cycle. To identify the start of the fertile time, women can use calendar calculations, observe cervical secretions, or monitor the changes in the position and feel of the cervix. To mark the end of the fertile window, women can use those same indicators as well as monitor the change in their basal body (resting) temperature (BBT).

The calendar calculations used to identify the fertile time were developed in the 1930s to estimate the days the woman is fertile in the current cycle based on her past lengths. If a woman uses a calendar calculation, the interval of time identified as potentially fertile is longer than the actual time she is fertile. This is because most calendar calculations take into account the lifespan of the gametes and fluctuations in past cycle length. The more a woman's cycle length varies, the longer the interval identified as potentially fertile.

The fertility signs and symptoms observed during woman's menstrual cycles are caused by changes in circulating oestrogen and progesterone levels. The oestrogen produced in increasing amounts by the growing follicle changes cervical secretions. After menstruation, the cervical secretions are negligible or absent. As more oestrogen is produced by the follicle, more fluids are secreted. Initially, these secretions are sticky, thick and cloudy. As oestrogen levels peak at midcycle, the secretions become clear stretchy and slippery. The last day on which clear, stretchy, slippery secretions are observed is known as the peak day.

These cervical secretions facilitate sperm transport through the cervix into the upper female genital tract where fertilization takes place. The presence of cervical secretions on a given day indicates that the woman is fertile. Near midcycle, the pituitary releases a surge of luteinizing hormone (LH). LH triggers ovulation and the ruptured follicle is then transformed into corpus luteum (CL). The progesterone produced by the CL counteracts the actions of oestrogen and causes secretions in the cervix to dry up and form a mucus plug that prevents sperm from traveling through the cervix. Progesterone also increases BBT around the time of ovulation. Oestrogen and progesterone also cause changes in the position and feel of the cervix itself. As ovulation approaches, the opening of the cervix becomes softer and wider, and the cervix pulls up higher in the vagina. After ovulation, the cervix returns to a lower position, and its opening closes and feels firmer. Because the fluctuating levels of hormones make fertility signs imprecise, markers of the beginning and end of the fertile time. Women must abstain or use a barrier method for several days longer than the actual fertile time.

Recent research shows that the actual fertile time is only about 6 days each cycle (FHI, Fall, 1996). The length of the fertile time is related to the lifespan of the gametes: sperm can live up to 5 days inside the female genital tract, and the egg lives less than one day (FHI, Fall 1996).

## Natural Contraceptive Options

### 1. Abstinence

Refraining from penetrative sex provides 100% protection from pregnancy and offers effective prevention of transmission of sexually transmitted infections as well. While this may be an impractical long-term family planning method for married couples, there are examples of periods of prolonged abstinence in certain cultural settings (www.fhi.org, 2003). Programmes aimed at unmarried adults and adolescents to delay first sex can have a positive impact in pregnancy prevention and can have other health education and economic benefits too.

### 2. Withdrawal or Coitus Interruptus

The withdrawal method of family planning is unlike other natural methods in that it is male-controlled. Withdrawal has been used for centuries, following the discovery that ejaculation into the vagina leads to pregnancy. This method is practiced by significant percentages of contracepting couples in Romania, Turkey, the Czech Republic and Mauritius (www.fhi.org, 2003). Most couples in those countries cite concerns about health and side effects of modern contraceptive methods as a major reason for using withdrawal, along with the partner preference, lack of knowledge of and access to modern methods, and the cost of modern methods.

An analysis of the literature on withdrawal revealed a lack of rigorous data on current prevalence, acceptability, use-effectiveness, service delivery issues and safety of this method (Jennings et al, 1998). Although it has been criticized as an ineffective method, withdrawal probably offers a level of contraceptive protection similar to that of barrier methods (Rogow et al, 1995). Effectiveness depends largely on the man's ability to withdraw prior to ejaculation. The best estimates of effectiveness indicate that about 4 percent of couples who use the method perfectly would experience a pregnancy in the first year; among typical users, the probability of pregnancy would be about 19 percent in the first year of use (Rogow et al, 1995).

### 3. Calendar Method

The calendar or rhythm method is the oldest and most widely practiced method of fertility awareness (FHI, Fall 1996). It is based on three assumptions: (1) that ovulation occurs fourteen days before the beginning of menstruation, plus or minus two days; (2) that sperm remains viable for three days and (3) that the ovum (egg) survives for twenty-four hours.

For a woman with very regular monthly cycles, she needs merely to count backwards from the first day of her period to locate the day on which she ovulated. Using this information, she can predict when ovulation will occur the following month and avoid intercourse around that time.

Most women however, do not ovulate at the same time each month, and no woman's cycles are identical every time. For this reason, a woman makes an estimate of the days she is fertile based on past menstrual cycle length. She does this with the expectation that the length of her current cycle and thus the time of her fertile phase is most likely to occur. All of the variations of this method involve setting the days of avoidance of unprotected intercourse by subtracting the upper limit of the rule from the number of days in the shortest of the previous 6 menstrual cycles and subtracting the lower limit of the rule from the number of days of the longest of the previous 6 menstrual cycles. For example, a woman's last 6 menstrual cycles range from 26 to 31 days in length. She has been taught the 11-18 rule, which means that she will abstain from sex or use a barrier method from day 8 (i.e. 27 subtract 18) until day 20 (i.e. 31 subtract 11) on month 7. This interval may be modified each month according to the length of previous cycles. Other rules include 9-19, 7-12, and 12-17.

One Meta analysis of eight studies of calendar rhythm estimated that, in typical use the failure rate of this method falls between 15 and 18 pregnancies per 100 women years (Kowal, 1998).

Women with irregular or unpredictable cycles are not good candidates for this method.

**4. Ovulation Method**

Ovulation method, also called Billings's method and cervical mucus method are methods based on the changes in cervical secretions due to

the effects circulating levels of oestrogen and progesterone, as earlier described. Introduced in the 1960s, these methods rely on daily self-examination for the detection of the quantity and evaluation of the quality of cervical secretions. It is based on the observation that in the absence of mucus, no egg is present, and sperm cannot survive long enough to fertilize an egg which may be released. During a typical monthly cycle, a woman first has a few days of menstrual bleeding, followed by a few "dry days" when the vagina seems quite dry. Then, closer to ovulation, she starts to have more wetness or mucus. As ovulation approaches, the mucus becomes clear and slippery and stretches without breaking, like a raw egg white. The last day of peak wetness is right before ovulation, and then come days of less mucus, if any noticed it will be cloudy. Any time the slippery stretchy mucus is noticed, intercourse should be avoided until two days after it is all gone – about eight days of each cycle.

Women are taught to feel for secretions throughout their cycles. Couples either abstain from sex or use a barrier method during menstruation and on alternate days prior to the appearance of cervical mucus. They abstain from unprotected intercourse from the time that the first sticky mucus appears until four days after the last clear, stretchy, slippery mucus is observed.

Data from a WHO study in five countries showed that, when this method is correctly used, the first year probability of pregnancy was 3.4 percent (Hatcher et al, 1998).

**5. Basal Body Temperature (BBT) Method**

Due to the actions of progesterone on the hypothalamus, a woman's body temperature rises slightly after she ovulates (0.2 to 0.5 degrees centigrade) and remains elevated until the end of the cycle. Women who use this method must chart their temperature every day, immediately after waking up and before getting out of bed or drinking any liquids. Couples relying on this method must abstain from unprotected intercourse between the first days of menstruation until after the third consecutive day of elevated body temperature, so unprotected sex, is limited to the postovulatory infertile time. This method is quite demanding for the couple as it imposes the longest duration of abstinence from unprotected sex, typically between 14 to 21 days. The effectiveness is high if couples can adhere to this schedule. Among perfect users, the first year probability of pregnancy is only about 2 per cent, during typical use, the probability of pregnancy is closer to 20 percent (Kambic and Lamprecht, 1996).

**6. Sympto – Thermal Method**

This method combines several techniques to predict ovulation. It typically involves monitoring and charting cervical mucus and position and temperature changes on a daily basis and may include other signs of ovulation such as breast tenderness, back pain or "heaviness", or light intermenstrual bleeding.

To use this method correctly, couples must abstain from unprotected sex, from the first sign or sensation of wet cervical mucus until the woman's body temperature has remained elevated for three days after peak day is observed. Effectively, the method uses the guidelines of the ovulation method to determine the onset of the fertile period and the guidelines of the BBT method to determine its end. This method reduces the number of days of abstinence required by the BBT method alone. However, the daily measurement and charting is more demanding than any of the above methods. As with other natural methods, the pregnancy rate for perfect users is about 2 to 3 percent in the first year; users who do not consistently follow the rules of the method can expect a 13 to 20 percent chance of pregnancy in the first year (www.fhi.org, 2003).

**7. Lactational Amenorrhoea Method (LAM)**

Research has confirmed that a form of breastfeeding to achieve contraception called LAM is more than 98 percent effective during the first 6 months following delivery (FHI, Fall 1996). Based on years of data from thousands of women in more than a dozen countries, the research also suggests that LAM may be dependable for longer – perhaps u to a year after giving birth.

During breastfeeding, ovulation is inhibited by series of physiological responses to nipple stimulation. More frequent or intense suckling sends nerve impulses to the mother's hypothalamus that disrupt normal signals to the pituitary

controlling hormone secretion; the resulting abnormal pattern of luteinizing hormone (LH) secretion is inhibitory to ovarian activity. When breastfeeding diminishes with less frequent breastfeeding and/or more frequent supplemental feeding, the chance of ovulation and subsequent pregnancy rises. (www.fhi.org, 2003)

To use LAM correctly, a woman must remain amenorrhoeic (no menstrual bleeding) since delivery, fully or nearly fully breastfeeding and be within six months of delivery. When any of these criteria changes, the woman should immediately begin to use another form of contraception if she wishes to prevent another pregnancy.

## 8. The Standard Days Method (SDM)

The Standard Days Method (SDM) is a new simple fertility awareness – based method. It relies on a "standard rule' or a fixed "window" of fertility that makes it easy for women to know when they are likely to become pregnant. This method involves no calculation or observation and is, therefore, easy for service providers to teach and for women to use. To avoid pregnancy, the woman should not have unprotected intercourse during the fertile window. Analysis of a large data set of woman's menstrual cycles from the World Health Organization (WHO0 trial of the ovulation method reveal that the fertile period is between day 8 to 19 of the cycle for women whose cycle length range from 26 to 32 (Trussell and Grummer-Strawn, 1999). About 80 percent of fertile women have cycle in

this range. A mnemonic device can be used to teach and help couples keep track of their fertility. This can be calendar on which women record their cycles. A device designed specifically for the SDM is a string of 32 plastic beads – a necklace – with different colors representing the fertile and infertile days of the menstrual cycle. The necklace is designed to make it very easy for women to know exactly which days of their cycles they are on, without having to write or record any information. The first day of the cycle, when bleeding begins, is represented by a red bead. Each day, the woman moves a small tight-fitting rubber ring along the necklace – from one bead to the next. Days 8 through 19 (the day's on which a couple should not have unprotected intercourse) are represented by 12 especially coloured beads.

Findings from a pilot study of the method showed that it is very acceptable to women and their partners and to service producers (FHI, Fall 1996). The positive aspects of the method mentioned were that it is natural, affordable, and causes no side effects or health risks. Women appreciated the simplicity of the necklace as a means of keeping track of their fertile and infertile days and they used it as a tool for facilitating communication with their partners.

A recently completed trial conducted that the probability of pregnancy in couples practicing this method perfectly is less than 5 percent in the first year of use. The "typical use" rate was closer to 12 percent (FHI, Fall, 1996).

## 9. The Two Day Method

The Two Day Method is a new observation-based method that relies on a simple algorithm to help women identify when they are fertile. The method is based on monitoring the signs and symptoms of fertility, namely, the observation of the presence or absence of cervical secretions. The Billings ovulation method is based on the same principles; the TwoDay method is another approach to interpreting the changes in the characteristics of cervical secretions that is easier to teach, learn and use. The Two-Day method requires only that a woman monitor the presence and absence of secretions to determine on each day if she is fertile. Each woman is taught to consider as "secretions" anything that she perceives coming from her vagina, except menstrual bleeding. The woman asks herself two simple questions each day: (1) did I note secretions today? (2) Did I note secretions yesterday? If she notices any secretions (today or yesterday), she is probably fertile and needs to abstain from unprotected intercourse to avoid pregnancy. If she notices any secretions on both days, she is not fertile. Analyses of reported secretions correlated with other indices of fertility and ovulation in the WHO data set and in an additional European data set indicate that the Two-Day method would be a highly effective approach to avoid pregnancy (Arevalo et al 1999).

In theoretical testing, results show that the Two-Day method would be effective in helping couples avoid pregnancy in both the preovulatory and postovulatory phases of the cycle. Estimated probability of conception for women

who abstain from unprotected intercourse according to the method rule is no more than 3 percent. Estimated mean length of the period for abstinence or use of a barrier method for couples practicing the Two-Day method is about 10 days.

## 10. Electronic Fertility Computers

One new method of birth control is a small electronic fertility computer, marketed under the name Persona, which tells a woman which days she is fertile (www.fhi.org, 2003). Fertile days are indicated with a red light and infertile days with a green light. If the light is yellow, the woman takes a urine test which changes the light to green or red, based on the amount of hormone found in the urine. This method is now available in Europe and Canada, where manufacturers boast of a failure rate as low as 6 percent among women abstaining on fertile days as indicated by the device. Clinical trials are now being conducted to obtain United States Food and Drug Administration (FDA) approval, but such devices are currently not in the market in the USA. One advantage of this method is that charting body signs are not necessary.

Disadvantages include the expense of the computer and the need to purchase urine test sticks for use for eight days out of each cycle. Additionally, this method is currently only recommended for women whose cycles are between 23 and 35 days (www.fhi.org, 2003).

Other models measure and store basal body temperature readings like the Lady Comp and Bioself models. The Lady Comp can be used by women with longer or irregular cycles such as those experienced postpartum.

## 9.12 SUMMARY

This chapter attempted a review of related literature to provide a broad-based background to the study.

Major concepts of the study were explained. The concepts of adolescence as well as significant physiological changes that occur in adolescence were highlighted. Some socio-cultural factors that influence adolescent behaviour were also discussed. Prominent among the identified socio-cultural factors were differences in power between men and women, gender roles and traditional practices.

The concept and components of reproductive health was discussed. The history of Nigerian guidelines on development process for reproductive health was also discussed.

Issues related to contraception were reviewed under contraceptive technology, which is mainly concerned with the application of scientific knowledge in the effective prevention of unintended pregnancies. The review also considered the physiology of menstrual cycle as well as various types of contraceptive methods such as hormonal methods, barrier methods, sterilization methods and the natural methods. Each method was discussed under the following

subheadings: indications, contraindications, effectiveness, procedure for use and side effects. This was based on 1999 WHO medical eligibility criteria for contraceptive use.

# CHAPTER THREE

# RESEARCH DESIGN METHOD AND PROCEDURE

## 3.1 INTRODUCTION

This chapter describes the instrument and procedure for data collection. The research design, population of the study, sample and sampling procedures, instrumentation as well as method of data analysis are discussed.

## 3.2 RESEARCH DESIGN

The research method employed for this study was the ex-post-facto research design to determine the relationship between knowledge of reproductive health and contraceptive use among tertiary institutions' students in Niger state. The ex post facto research design according to Kerlinger (1993) is "a systematic empirical inquiry in which the scientist does not have direct control of independent variables because their manifestations have already occurred or because they are inherently not manipulable".

## 3.3 POPULATION OF THE STUDY

The population of this study consisted of all students of the thirteen tertiary institutions in Niger state of Nigeria. The student population as at 2006/2007 academic session according to records from the student affairs departments of all the schools is thirty five thousand (35,000).

## 3.4 SAMPLE AND SAMPLING PROCEDURES

In a large population, it is not possible or desirable to manipulate or take data from the whole population (Polit and Hungler, 2003; Kerlinger, 1993).

For the purpose of this study, a sample of 700 was used in accordance with Fisher, Laing and Towsend (1998).

Stratified and systematic sampling procedures were employed. The first stage involved stratification of the institutions into a) University, b) Polytechnic, c) Monotechnic, d) College of Education.

The second stage involved the random selection of one institution from each stratum. To achieve this, institutions in each stratum were listed and assigned numbers from which one number was selected using a hat-draw method.

**Table 3.1: Distribution of Tertiary institutions according to clusters**

| **Stratum** | **Institution** |
|---|---|
| a) University | 1) Federal University of Technology,Minna<br>2) IBB University, Lapai |
| b) Polytechnic | 1) Federal Polytechnic, Bida<br>2) Niger State Polytechnic, Zungeru |
| c) Monotechnic | 1) Federal College of Fishery Technology,New-Bussa<br>2) Federal College of Wildlife Management, Wawa<br>3) Niger State College of Agriculture, Mokwa<br>4) Niger State School of Nursing, Bida<br>5) Niger State School of Midwifery, Minna<br>6) Niger State School of Health Technology, Minna<br>7) Niger State School of Health Technology, Tungan-Magajiya |
| d) College of Education | 1) Federal College of Education, Kontagora<br>2) Niger State College of Education, Minna |

However, it is important to note that in the Monotechnic cluster, all health-related institutions do not qualify as sample because they take special instructions on reproductive health and contraception.

The health-related institutions include School of Nursing Bida, School of Midwifery Minna, Schools of Health Technology Minna and Tungan Magajiya.

A total of four (4) institutions were sampled for the study. They include Federal University of Technology Minna, Federal Polytechnic Bida, College of Education Minna, and College of Agriculture Mokwa.

In the third stage, the academic departments in the selected institutions were stratified into faculties/schools. The departments in each faculty/school were listed and assigned numbers from which a number was drawn using hat-draw method. A total of twelve (12) academic departments were selected for the study, from which ten percent (10%) of each sampled department was used. This was in accordance with Nwana (2005), who considered 10% as an adequate sample for studies in social sciences where the total population is more than 10,000.

Finally, a table of random numbers was used to determine the sampling interval (*kth* element) for systematic sampling, by blind random start. Sampling interval of five (5) was selected. Utilizing the class lists, every fifth student from the sampled departments was selected to serve as respondent in this study. A total of 700 students from twelve departments as presented in table 3.2 constituted the sample of the study.

**Table 3.2: Summary of sampled departments and students**

| Category | Institution | Department | No. of Students |
|---|---|---|---|
| A | University | Agriculture engineering | 45 |
| | | EducationTechnology | 50 |
| | | Mathematics/Computer | 66 |
| | | Microbiology | 55 |
| | | Urban & Regional planning | 64 |
| B | Polytechnic | Electrical Engineering | 60 |
| | | Mass communication | 65 |
| | | Secretarial studies | 58 |
| C | Monotechnic | Agric. Extension & Management | 62 |
| | | Crop Production | 44 |
| D | C.O.E | Business Education | 65 |
| | | Social Studies | 66 |
| | | | Total:700 |

## 3.5 INSTRUMENT FOR DATA COLLECTION

The instrument for data collection was the questionnaire. The questionnaire was adapted from sexual knowledge and attitude test (SKAT), originally designed by the Centre for the Study of Sex Education in Medicine of the Division of Family Study, Department of Psychiatry, University of

Pennsylvania, USA (Harold and David, 1991); and from Demographic and Health Survey (DHS, 2000).

The questionnaire consisted of fifty two (54) items in three (3) sections. Section A consisted of six (6) items on demographic information, Section B forty one (41) items on knowledge about reproductive health, and Section C seven (7) statements on contraceptive use.

## 3.6 VALIDATION OF QUESTIONNAIRE

Copies of the draft questionnaire were given to experts in the fields of health education, medical sociology, community medicine and education under the guidance of the supervisors for content and face validity.

Based on the suggestions of the experts, a final questionnaire was prepared and used for this study.

## 3.7 STATISTICAL TECHNIQUES

The data collected were coded and analyzed at the Iya Abubakar Computer centre, Ahmadu Bello University, Zaria. The scores of each section categorized. Special statistical Package for Social Sciences (SPSS) was used for the analysis. Descriptive statistics of frequencies and percentages were computed. The data were then subjected to chi square analysis to determine the relationship between the variables. Student t-test and ANOVA techniques were

also computed to determine differences between and among variables. The results of the analysis are presented in chapter four (4) of this study.

# CHAPTER FOUR

# PRESENTATION AND ANALYSIS OF DATA

## 4.1 INTRODUCTION

The purpose of the study was to determine the relationship between reproductive health knowledge and contraceptive use among adolescents. To achieve this purpose, a total of 700 questionnaires were administered with a return rate of 84% (588). Data collected from the 588 respondents were statistically analyzed using the special package for social sciences (SPSS). The results are presented and discussed according to the formulated hypotheses.

## 4.2 RESULTS

The demographic characteristics of the respondents are shown below.

**Table 4.1: Distribution by Age, Sex and Religion**

| Background characteristics | F.U.T Minna | | F. Poly. Bida | | C.O.E Minna | | C.O.A Mokwa | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| | N | % | N | % | N | % | N | % | N | % |
| **Age** | | | | | | | | | | |
| 16-24 | **90** | **37.7** | **36** | **14.3** | **44** | **17.5** | **42** | **16.7** | **252** | **42.9** |
| 25-34 | **76** | **38.1** | **4** | **2.0** | **36** | **18.0** | **32** | **26.0** | **200** | **34.1** |
| 35 and above | **18** | **31.0** | **6** | **10.3** | **18** | **31.0** | **18** | **31.0** | **58** | **9.7** |
| No response | **26** | **33.3** | **6** | **7.7** | **12** | **15.4** | **34** | **43.6** | **78** | **13.3** |
| | | | | | | | | | **588** | **100** |
| **Sex** | | | | | | | | | | |
| **Male** | **140** | **39.8** | **46** | **13.1** | **60** | **17.0** | **106** | **30.1** | **352** | **59.9** |
| **Female** | **70** | **29.7** | **76** | **32.2** | **50** | **21.2** | **40** | **16.9** | **236** | **40.1** |
| | | | | | | | | | **588** | **100** |
| **Religion** | | | | | | | | | | |
| **Islam** | **138** | **38.3** | **42** | **11.7** | **33** | **18.3** | **114** | **31.7** | **360** | **61.2** |
| **Christianity** | **70** | **30.7** | **78** | **34.2** | **44** | **19.3** | **32** | **14.0** | **228** | **38.8** |
| | | | | | | | | | **588** | **100** |

Table 4.1 shows that out of a total of 588 respondents, 252 (42.9%) were within the age group of 16 – 24 years. Majority of them i.e. 352 (59.9%) were males, 236 (40.1%) were females. The table further reveals that a total of 228 (38.8%) of the respondents are Christians with the majority (360 or 61.2%) being Muslims.

**Table 4.2: Distribution of Respondents by Ethnicity and Marital Status**

| Background characteristics | F.U.T. Minna | | F. Poly. Bida | | C.O.E. Minna | | C.O.A. Mokwa | | Total | |
|---|---|---|---|---|---|---|---|---|---|---|
| **Ethnicity:** | | | | | | | | | | |
| Gbagyi | 36 | 32.7 | 36 | 23.6 | 16 | 14.5 | 32 | 29.0 | 110 | 18.7 |
| Hausa | 28 | 29.5 | 10 | 10.4 | 18 | 18.8 | 40 | 41.7 | 96 | 16.3 |
| Ibo | 22 | 35.5 | 22 | 35.5 | 12 | 19.4 | 6 | 9.7 | 62 | 10.5 |
| Nupe | 78 | 41.5 | 26 | 13.8 | 42 | 22.3 | 42 | 22.3 | 188 | 32.1 |
| Yoruba | 36 | 37.5 | 24 | 25.0 | 18 | 18.8 | 18 | 18.8 | 96 | 16.3 |
| Others | 10 | 27.8 | 14 | 33.9 | 4 | 11.1 | 8 | 22.2 | 36 | 6.1 |
| | | | | | | | | | 588 | 100 |
| **Marital Status** | | | | | | | | | | |
| Single | 150 | 38.9 | 84 | 21.8 | 58 | 15.0 | 94 | 24.4 | 386 | 65.6 |
| Married | 36 | 28.9 | 36 | 18.6 | 50 | 25.8 | 52 | 63.9 | 194 | 33.0 |
| Divorced | 4 | 10.0 | - | - | - | - | - | - | 4 | 0.7 |
| Partnered | - | - | 2 | 50.0 | 2 | 50.0 | - | - | 4 | 0.7 |
| | | | | | | | | | 588 | 100 |

Table 4.2 shows that majority of respondents, 188 (32.1%) were from the Nupe ethnic group. This was followed in descending order by Gbagyi 110 (18.7%), Hausa and Yoruba ethnic groups have 96 (16.3%) respectively, and other ethnic groups combined together constitute the fewest respondents, 36 (6.1%). The other ethnic groups include Kambari, Kamuku, Dukawa, Bini and Isoko ethnic groups.

## 4.3 TEST OF HYPOTHESES

There is no significant relationship between reproductive health knowledge and contraceptive use among tertiary institutions' students in Niger State.

In order to test this hypothesis, the data collected were first assessed to determine whether the correct responses were given with regards to items on knowledge of reproductive health.The percentage scores are shown in Table 4.3.

**Table 4.3: Percentage distribution of responses on knowledge of Reproductive health**

| Percentage scores (x) | Frequency (f) | Percentage (%) |
|---|---|---|
| 95 – 99 | 4 | 0.7 |
| 90 – 94 | 6 | 1.0 |
| 85 – 89 | 16 | 2.7 |
| 80 – 84 | 54 | 8.8 |
| 75 – 79 | 74 | 12.6 |
| 70 – 74 | 82 | 13.9 |
| 65 – 69 | 66 | 11.2 |
| 60 – 74 | 76 | 12.9 |
| 55 – 59 | 80 | 13.6 |
| 50 – 54 | 90 | 11.9 |
| 45 – 49 | 36 | 6.1 |
| 40 – 44 | 4 | 0.7 |
| 35 – 39 | 18 | 3.1 |
| 30 – 34 | 2 | 0.3 |
| 25 – 29 | 2 | 0.3 |

Table 4.3 shows that majority of the respondents 15.3% (90) scored between 50 – 54% followed by 13.9% (82), 13.6% (80) respondents with a score range of 70 - 74% and 55 - 59% respectively. The scores with the least number of respondents were the 25 - 29% and 30 - 34% range. This was recorded by two respondents (0.3%) each.

Using 50 – 54% as the average mark range, the table shows that cumulatively, majority of the respondents i.e. 89.5% (526) scored average and above, while only 10.5% (62) respondents scored below average.

Furthermore, Table 4.3 revealed a clustering of the distribution (scores) around the centre, indicating a central tendency of the reproductive health knowledge among the respondents.

Furthermore, the frequency of contraceptive use among respondents were obtained and analyzed. The results are shown in Table 4.4.

**Table 4.4: Distribution of respondents according to contraceptive use**

| | Characteristics | N | % |
|---|---|---|---|
| **A** | **Use of any contraceptive in the last 12 months** | | |
| | Yes | 236 | 40.1 |
| | No | 196 | 33.4 |
| | No response | 156 | 26.5 |
| **B** | Contraceptive effectiveness of method | | |
| | Effective | 224 | 38.0 |
| | Ineffective | 12 | 5.1 |
| **C** | Effective contraceptive method ever used other than those of last 12 months | | |
| | Effective | 228 | 38.8 |
| | Ineffective | 4 | 0.7 |
| | None | | |
| **D** | The last time contraceptive was used | | |
| | Less than a month ago | 78 | 13.3 |
| | More than a month ago | 202 | 34.4 |
| | No response | 308 | 52.4 |
| **E** | Frequency of contraceptive use | | |
| | Most times | 236 | 40.1 |
| | Few times | 80 | 13.6 |
| | Hardly/not at all | 18 | 3.1 |
| | No response | 224 | 38.1 |
| | **Total** | **588** | **100** |

Table 4.4 shows that most respondents 236 (40.1%) agreed to have used contraceptive within the last 12 months, while about one-third of the respondents 196 (33.4%) have not used any contraceptive method within the same period of time. Few of the respondents 156 (26.5%) however did not indicate whether or not they practiced contraception within the last one year.

On the effectiveness of the contraceptive methods used, majority of the respondents 224 (38.0%) indicated the use of methods that are considered to be

effective in modern contraceptive, while only 12 (5.1%) indicated the use of methods that are considered ineffective.

With regards to use of any other contraceptive methods other than those used in the last 12 months, majority, 356 (60.5%) stated that no other method was ever used, while 228 (38.8%) indicated the use of other effective methods, with only as few as 4 (0.7%) respondents indicating methods that are ineffective.

The last time a contraceptive method was used by the respondents as shown in Table 4.4.D indicated that 202 (34.4%) of the respondents stated that the last time they used a contraceptive method was more than a month ago, while 78 (13.3%) stated less than a month. However, majority 308 (52.4%) declined from stating any response.

Table 4.4.E further reveals that most respondents 236 (40.1%) used contraceptive methods most of the time, while 80 (13.6%) used contraceptives only sometimes and 18 (3.1%) hardly used any contraceptive method.

Finally, the respondents' scores on the knowledge of reproductive health were categorized based on whether they are adequate or not (Scores 50% and above are considered adequate, while scores less than 50% are considered inadequate). The analysis is based on the information from 432 (73%) respondents who responded either "Yes" or "No" to contraceptive use in the last 12 months. Information from the 156 (26.5%) respondents that did not indicate

use of contraceptives was excluded from the analysis. The responses are presented in Table 4.5.

**Table 4.5: Knowledge of reproductive health and contraceptive use**

| | **Contraceptive use** | | **Total** |
|---|---|---|---|
| | **Yes** | **No** | |
| Adequate knowledge | 178 | 58 | 236 |
| Inadequate knowledge | 34 | 162 | 196 |
| **Total** | **212** | **220** | **432** |

Chi-square($x^2$) technique was used to determine the relationship between adequacy of reproductive health knowledge and use of contraceptives among the students.

**Relationship between knowledge of reproductive health and contraceptive use**

Chi square ($x^2$) statistic was used to calculate the relationship between knowledge of reproductive health and contraceptive use.

Calculated $X^2$ =144.6 Critical $x^2$ = 3.481 at 1 df $p<0.05$

The result shows that the calculated $x^2$ value (144.6) is greater than the critical value at 1 degree of freedom at 0.05 level of significance (3.481). The

decision is that the null hypothesis is rejected and the conclusion is that there is significant relationship between knowledge of reproductive health and contraceptive use.

To determine the direction and extent of the relationship between knowledge of reproductive health and contraceptive use, the Phi coefficient ($\phi$) was used. The calculated Phi coefficient ($\phi$) value is 0.6

The value of the Phi coefficient ($\phi$) therefore suggests a moderate positive correlation between knowledge of reproductive health and contraceptive use.

**Sub-hypothesis 1**

There is no significant difference in reproductive health knowledge and type of school of students of tertiary institutions in Niger State.

Analysis of variance (ANOVA) was used to determine the differences in respondents' knowledge according to schools, namely; University, Polytechnic, College of Education and Monotechnic. Summary of the results are presented in Table 4.6.

**Table 4.6: Summary of ANOVA for knowledge of Reproductive health Knowledge according to schools**

| | D.F | Sum of square | Mean squares | F. ratio | F. probability |
|---|---|---|---|---|---|
| Between groups | 3 | 1180.6 | 393.5 | 19.94 | 0.05 |
| Within groups | 584 | 11454.1 | 39.5 | | |
| **Total** | **293** | **12634.7** | | | |
| | | | | f-critical = 2.62 | |

Results on Table 4.7 shows that the calculated F-statistic (19.94) is more than the critical (table) value (2.62) at the 3 and 584 degrees of freedom at 0.05 level of significance. The decision is that the null hypothesis is rejected. This implies that significant differences exist among the students in their knowledge of reproductive health according to schools.

**Sub-hypothesis 2**

There is no significant difference in reproductive health knowledge and religion of tertiary institutions' students in Niger State.

ANOVA was used to determine the differences in reproductive health knowledge according to the respondents' religions. The summary of the results are presented in Table 4.7.

**Table 4.7: Summary of ANOVA for knowledge of Reproductive health According to religion.**

| | D.F | Sum of square | Mean squares | F. ratio | F. probability |
|---|---|---|---|---|---|
| Between groups | 2 | 4.08 | 2.04 | 0.08 | 0.05 |
| Within groups | 585 | 12624.6 | 43.2 | | |
| **Total** | **587** | **12628.6** | | | |
| | | | | f - critical = 3.07, at 2 and 585 df <p0.05 | |

The F-statistic (table value) at the 2 and 585 degree of freedom at 0.05 level of significance is 3.07. Table 4.8 shows that the calculated (F. ratio) of 0.08 is less than the critical value of 3.07. The conclusion is that the null hypothesis is accepted, meaning that there are no significant differences in the mean reproductive health knowledge of the Muslims, Christians and believers of other religions, in their knowledge of reproductive health. This indicates similarity in their knowledge of reproductive health.

**Sub-hypothesis 3**

There is no significant difference in their reproductive health knowledge and age of tertiary institutions' students in Niger State.

ANOVA was used to determine the differences in reproductive health knowledge among respondents according to age.

The summary of ANOVA for the four age groups is presented in Table 4.8.

**Table 4.8: Summary of ANOVA for Reproductive health knowledge According to age**

| | **D.F** | **Sum of square** | **Mean squares** | **F. ratio** | **F. probability** |
|---|---|---|---|---|---|
| Between groups | 3 | 318.0 | 106.0 | 4.998 | 0.05 |
| Within groups | 585 | 12310.4 | 42.45 | | |
| **Total** | **587** | **12628.6** | | | |
| | | | f-critical = 2.68 at 3 and 585 df p<0.05 | | |

The result shows that the calculated value (4.998) is less than the critical (table) value (2.68) at the 3 and 585 degrees of freedom and at 0.05 level of significance. The null hypothesis is hereby accepted. The conclusion is that there are no significant differences among respondents' knowledge of reproductive health according to age i.e. the knowledge of reproductive health of various age groups of the respondents is similar.

**Sub-hypothesis 4**

There is no significant difference in reproductive health knowledge of male and female students of tertiary institutions in Niger State.

Student t-test was used in analyzing the data. The summary of results for differences between males and females in their knowledge of reproductive health is presented in Table 4.9.

**Table 4.9: Summary of t-test for male and female respondents' Knowledge of reproductive health**

| | **No. of cases** | **Mean** | **Standard deviation** | **Standard error** | **D.f** | **t-value** | **P** | **t-critical** |
|---|---|---|---|---|---|---|---|---|
| **Group 1** Male | 352 | 47.4 | 8.812 | 0.664 | 586 | 41.66 | 0.05 | 1.980 |
| **Group 2** Females | 336 | 49.98 | 9.796 | 0.902 | 586 | | | |
| | | | t- critical = 1.980 at 586 df, p<0.05 | | | | | |

Table 4.9 shows that the value of t-statistic at 293 degrees of freedom at 0.05 level of significance is 1.980. The calculated t-value (41.66) is greater than the t-critical (1.980) value, therefore, the null hypothesis is rejected. This implies

that the difference between males and females in their knowledge of reproductive health is significant.

**Sub-hypothesis 5**

There is no significant difference in reproductive health knowledge and ethnicity of tertiary institutions' students in Niger State.

ANOVA was used to determine the difference among Gbagyi, Hausa, Ibo, Nupe, Yoruba and other ethnic groups in their knowledge of reproductive health according to their ethnic groupings. The summary of the results are presented in table 4.10.

**Table 4.10: Summary of ANOVA for knowledge of reproductive health According to ethnic groups**

| | **D.F** | **Sum of square** | **Mean squares** | **F. ratio** | **F. probability** |
|---|---|---|---|---|---|
| Between groups | 5 | 211.3 | 42.26 | 0.094 | 0.05 |
| Within groups | 582 | 12417.4 | 43.1 | | |
| Total | 587 | 12628.7 | f- critical = 2.29 at 5 and 582 df $p<0.05$ | | |

The Table shows that the calculated F- value is 0.094. The critical value at the 5 and 582 degrees of freedom at 0.05 level of significance is 2.29. The

calculated value (0.047) is less than the critical value (2.29). The null hypothesis is hereby accepted, meaning that ethnicity has no significant influence on the students' knowledge of reproductive health.

**Sub-hypothesis 6**

There is no significant difference in contraceptives use of male and female students of tertiary institutions in Niger State.

Chi($x^2$) statistical technique was used to determine differences between male and female students in their use of contraceptives. The summary of the results are presented in Table 4.11.

**Table 4.11: Summary of $x^2$ for males and females as regards use of Contraceptives**

| **O** | **E** | **O – E** | **$(O - E)^2$** | **$\frac{(0 - E)^2}{E}$** |
|---|---|---|---|---|
| 118 | 189.2 | 46.8 | 2190.2 | 9.2 |
| 40 | 126.8 | -46.8 | 2190.2 | 27.4 |
| 58 | 162.8 | -46.8 | 2190.2 | 18.9 |
| 78 | 109.2 | 46.8 | 2190.2 | 14.0 |
| | | | | $X^2 = 69.5$ |
| | | | $x^2$ - critical = 3.481 at 1 df p<0.05 | |

The calculated $x^2$ from Table 4.11 is 69.5. The value of $X^2$ at 1 degree of freedom at 0.05 level of significance is 3.481 (table value).

The calculated $x^2$ value (69.5) is greater than the critical (table) value (3.481); therefore, the decision is that the null hypothesis is rejected. The conclusion is that the differences between males and females in their contraceptive use are significant.

**Sub-hypothesis 7**

There is no significant difference in contraceptive use and religion of tertiary institutions' students in Niger State. Chi-square (x2) statistic was used to analyze the data.

The summary of the results of $x^2$ are presented in Table 4.12.

**Table 4.12: Summary of $x^2$ for Muslims and Christians as regard the use of contraceptives**

| O | E | O – E | $(O - E)^2$ | $\frac{(0 - E)^2}{E}$ |
|---|---|---|---|---|
| 196 | 137.1 | 58.9 | 3469.2 | 25.3 |
| 164 | 222.8 | -58.8 | 3457.4 | 15.5 |
| 28 | 86.8 | -58.8 | 3457.4 | 39.8 |
| 200 | 141.1 | 58.9 | 3469.2 | 24.6 |
| | | | | $X^2 = 105.2$ |
| | | | $x^2$ critical = 3.481 at 1 df, $p<0.05$ | |

The value of $x^2$ at 1 degree of freedom at 0.05 level of significance is 3.481. From Table 4.13, the calculated $x^2$ is 105.2. The calculated $x^2$ (105.2) is greater than the critical value (3.481). The decision is that the null hypothesis is rejected, and the conclusion is that there are significant differences between Muslim and Christian students in their use of contraceptives.

**Sub-hypothesis 8**

There is no significant difference in contraceptive use and marital status of tertiary institutions' students in Niger State.

The summary of the results of $x^2$ are presented in table 4.13.

**Table 4.13: Summary of $x^2$ for students' use of contraceptives According to marital status**

| O | E | O – E | $(O - E)^2$ | $\frac{(0 - E)^2}{E}$ |
|---|---|---|---|---|
| 236 | 186.1 | 49.9 | 2490 | 13.4 |
| 46 | 95.9 | -49.9 | 2490 | 26.0 |
| 4 | 101.6 | -97.6 | 9525 | 93.8 |
| 150 | 52.4 | 97.6 | 9525 | 181.8 |
| 148 | 100.3 | 47.7 | 2275 | 22.7 |
| 4 | 51.7 | -47.7 | 2275 | 44.0 |
| | | | | $X^2 = 380.9$ |
| | | | $x^2$ critical = 5.991 at 2 df, p<0.05 | |

The value of $x^2$ at 2 degrees of freedom at 0.05 level of significance is 5.991. Table 4.13 shows that the calculated value of $x^2 = 380.9$. The calculated value (380.9) is greater than the critical value (5.991). The null hypothesis is therefore rejected. It was therefore concluded that there are significant differences among married, single and divorced students in their use of contraceptives.

## 4.2 DISCUSSION

The focus of this study was to determine the knowledge of reproductive health, contraceptive use and the relationship between knowledge of reproductive health and contraceptive use among students of tertiary institutions in Niger state. Reproductive health knowledge was assessed based on the content of guidelines for sexuality education in Nigeria. In the first stage, contraceptive use was determined by adopting some of the items (questions) from the Demographic and Health Survey (DHS), as well as Sexual Knowledge and Attitude Test (SKAT). And in the final stage, results from the assessment of knowledge of reproductive health were correlated with those from contraceptive use, using the appropriate statistical techniques.

### 4.3.1 Knowledge of Reproductive Health

The results of the reproductive health knowledge show that well over two-third of the respondents (89.5%) scored average and above. This finding is in contrast with those of Kiragu and Zabin (1995), conducted among secondary school students in *Nakuru* district of Kenya, in which the overall level of reproductive knowledge was evaluated to be quite low. For example, in that study, only 16% of the males and 31% of the females knew the correct answer to when in a month, a female is most likely to become pregnant if she has sex. Similarly, in another study Richter, Strack, Vincent and Rad (1997) reported a significantly low knowledge scores on pregnancy prevention among adolescent respondents.

However, Moronkola and Idris (2000), in similar study among female secondary school students in Ibadan, Nigeria, reported 53% sexual health knowledge among their respondents. The reason for the increase in reproductive health knowledge in this study might be attributed to increased access to information particularly in the electronic media such as the internet over the years. The population in this study, i.e. students of tertiary institutions in Niger state, has increased access to internet facilities at affordable cost. Therefore, they are more likely to be better informed about many issues including reproductive health.

### 4.3.2 Contraceptive Use

Overall findings from the study indicate that the practice of contraceptive was low among the respondents considering the percentage of those with adequate knowledge of reproductive health. The results showed that only 40.1% (about one-third) admitted using contraceptives most of the time, they engaged in sexual intercourse in the last 12 months. This finding concurs with those of Pachauri and Santhya (2002) and UNFPA (1998) conducted among adolescents in Pakistan. In the UNFPA report, it was found that less than one in five sexually active unmarried adolescents used contraceptives. Another study by Nhan (1996) in Vietnam, examined contraceptive use at first intercourse among unmarried 17 – 24 year-old students. Results of that study showed that only 28% of young men and 32% of young women used contraceptives.

Furthermore, low contraceptive use is also consistent with those reported by Kiragu and Zabin (1995) conducted in Kenya in which only about 10% of young people who was sexually active reported regular use of contraceptives.

These low levels of contraceptive use probably reflect the spontaneity of adolescent sexual activity, as well as the many barriers young people face when they attempt to obtain contraceptives. To use contraceptives in Nigeria, a young person must raise the issue with a possibly suspicious partner, and overcome obstacles from a health system that is not accommodating to adolescent clients. It is not surprising then that few young persons use contraceptives as represented in this study.

### 4.3.3 Relationship between Knowledge of Reproductive Health and Contraceptive Use

Results of this study indicate a moderately positive relationship between knowledge of reproductive health and contraceptive use. Young persons who have adequate knowledge of reproductive health were significantly likely to have used any contraceptive method than those who have inadequate knowledge.

This finding however, disagreed with that of Kiragu and Zabin (1995). They reported that knowledge of family planning methods was negatively associated with contraceptive use among females.

However, Zlidar et al (2003) stated that awareness (knowledge) of at least one contraceptive method is necessary for practicing contraceptive. They

further opined that the more knowledgeable people are in a range of effective contraceptive methods, the more they make informed choices on contraceptive.

Though a positive relationship was found to exist between reproductive health knowledge and contraceptive use, the low level of contraceptive use identified earlier in this study is a source for concern. This underscores the fact that knowledge of reproductive health alone is not enough to effect the desired contraceptive practices among young people. Access to services, the extent of communication between partners, attitude about social and sexual roles and the taboo nature of their sexual activity all influence young person's sexual decision-making (Billy, Brewster and Grady, 1994).

### 4.3.4 Knowledge of Reproductive Health by Demographic Characteristics

The results of the study showed significant differences in knowledge of reproductive health among the four types of schools. These differences are attributable to the fact that content of reproductive health education vary among schools. Individual schools or teachers choose the reproductive health topics taught (Sikes, 1993) or because of its controversial nature, teachers object to the materials or have not been trained (Meekers, Gage and Li, 1995).

With regards to differences in reproductive health knowledge between the Christians and Muslims, the results showed no significant difference. This finding supports those of Kiragu and Zabin (1995) where it was reported that no

significant effect of religiosity on reproductive health knowledge was found. This suggests that adolescents from the two major religions (Christianity and Islam) are not engaged in any special reproductive health education programme.

It was also found that there are no significant differences among the age groups in their reproductive health knowledge. This underscores the fact that adolescence is not a specific age range but in the views of McCauley and Salter (1995), is a period in which a young person is no longer considered a child, and is also not yet considered an adult.

In addition, the study found significant differences between males and females in their reproductive health knowledge. This finding is similar to Kiragu and Zabin (1995) in which half of the males are knowledgeable about reproductive health compared with only about 40% of the females. This is probably because boys have more access to sexual health information (Best, 2000).

As to whether ethnicity of respondents plays a role in their reproductive health, data from the study failed to provide evidence to support this hypothesis.

### 4.3.5 Differences in contraceptive use

Results from the study revealed that there are significant differences between males and females in their use of contraceptives. This suggests that males and females vary in their use of contraceptive. This finding is in support of Makinwa-Adebusoye (1992), in a study conducted among young urban

Nigerians. The study showed that current contraceptive use was 39% and 42% for females and males respectively. These differences in contraceptive use between males and females are attributable to the fact that most often, sexual intercourse among young females is unplanned or unwanted. Other reasons include: limited knowledge about contraception and lack of decision-making and lack of power (McCauley and Salter 1995; Fikree et al, 2001). Sexual activity without contraception often results in unintended pregnancy.

Data on the differences in contraceptive use between Muslim and Christian respondents showed that Christian students are more likely than the Muslims to be users of contraceptives. This finding disagrees with that of Makinwa-Adebusoye (1992). The study found out that young persons who are of Roman Catholic Christian religion who belonged to the Igbo ethnic group were less likely than others to have initiated sexual intercourse and contraceptive use.

Finally, as might be expected, contraceptive use significantly differs between the married and the single respondents. This is in line with Zlidar et al (2003). They found out that the highest levels of contraceptive use were among unmarried, sexually active persons, compared with the married. This is because young married persons often face cultural expectations and social pressure to "prove" their childbearing abilities to their families (Pachauri, 1996).

# CHAPTER FIVE

# SUMMARY, CONCLUSION AND RECOMMENDATIONS

## 5.1 Summary

One-third of the world population are young people between ages 10 and 24. Young people today marry late, and more engage in sexual activities before marriage. Thus, they face more risk of unintended pregnancies and sexually transmitted infections (STI). In developing countries like Nigeria, 20% to 60% of young women's pregnancies and births are unintended. Pregnancy puts young women health at risk, through childbearing or unsafe abortion. Early parenthood means loss of education as well, and by extension lifelong loss of earnings.

Sexually, active people who do not desire pregnancy but are not using contraception are defined as having unmet need for contraception. Unmet needs in young people are evident in high rates of premarital conception, unplanned pregnancy and mortality and morbidity resulting from unsafe abortion.

Meeting the reproductive health needs of young people requires among other things the provision of adequate factual information (education), guidance about sexual responsibility (health education) and access to healthcare.

The purpose of this study was to determine reproductive health knowledge and contraceptive use among tertiary institutions' students in Niger State. To achieve this purpose, a research questionnaire adapted from SKAT

and DHS consisting of fifty-two (52) items with three(3) sections, was developed. To ensure face validity, five (5) experts from the Departments of Community Medicine, Sociology, Education, and Physical and Health Education of Ahmadu Bello, University, Zaria vetted the instrument. Their corrections and suggestions were adopted in the preparation of the final questionnaire. The questionnaire was administered on 700 respondents with 84% return rate (588 respondents).

Results of the study revealed a significant level of reproductive health knowledge, low contraceptive use, and moderately strong positive relationship between reproductive health knowledge and contraceptive use. Furthermore, the study failed to establish significant differences in knowledge of reproductive health according to most of demographic characteristics such as religion, age and ethnicity. However, significant differences were found to exist in contraceptive use according to demographic characteristics that were tested. These include sex, religion and marital status.

## 5.2 FINDINGS

On the basis of the data obtained from this study and in view of the limitations, the following conclusions are drawn:

i. Young people are knowledgeable about reproductive health.

ii. In spite of reproductive health knowledge, few young persons use contraceptives.

iii. Contraceptive use is more likely to occur among young persons who have adequate knowledge of reproductive health, than among those with inadequate knowledge.

iv. Demographic variables like age, religion and ethnicity do not significantly determine young people's knowledge about reproductive health.

v. Religion, marital status and sex significantly influence young peoples' use of contraceptives.

## 5.3 RECOMMENDATIONS

Based on the findings of the study, the following recommendations are made to improve reproductive health of young persons:

i. The study showed that young people are knowledgeable about reproductive health, but only few use contraceptives. Young persons should be equipped with skills needed to translate knowledge into healthy behaviours. Reproductive health education should involve drama, role play and symposia that promote youths' participation in interpersonal skills that might lead to healthful practice.

ii. Access to reproductive health services should be improved through provision of confidential, youth specific, readily accessible services offered at affordable prices or for free. Such services should include counseling services and be located in the schools, recreation places

and clinics. The providers should be well trained and should, if possible, be youths.

iii. Contents and methods of reproductive health education should be uniform in schools and be reviewed periodically to reflect current research findings.

iv. Reproductive health education should consider variables like religion, marital status and sex to ensure success.

## 5.4 Recommendations for further studies

This study found low contraceptive use in spite of knowledge of reproductive health. It is not clear what factors are responsible for this. It is therefore suggested that studies on determinants of contraceptive use among youths who are knowledgeable in reproductive health, should be conducted.

## REFERENCES


Action Health Incorporated (1996). Guidelines for comprehensive Sexuality Education in Nigeria. Yaba.

Adinma JIB, Okeke AO 'The Pill: perception and usage among Nigerian students. Adv. Contraception 1993; 9 345 - 346

Amazigo U, Silva N, Kaufman, J and Bikes, D S. Sexual activity and contraceptive knowledge and use among in-school adolescents in Nigeria. International Family Planning Perspectives 1997; 23 (1) 28 - 33.

Anas-Kolo S. Sexual behaviour of adolescents. Dissertation for part 11 Fellowship of the National Postgraduate College of Public Health, NPMC 1997

Annonymous. (1997). Reproductive Health. Network Fall 18(1)

Apelo, R.A. ,and Sulpido, A. (1985). Clinical Assessment of new Triphasic Oral contraceptive. Clinical Therapeutics. 8(1) 61-70

Apelo, R.A. ,and Sulpido, A. , in Blackburn et al. (2000). Oral contraceptives-An update. Population Reports. Series A (9)

Araoye, M.O. , and Fakeye, O.O. (1998). Sexuality and Contraception among Nigerian adolescents and youths. African Journal of Reproductive Health. 2 (2) 142-150

Barker, G.K. and Rich, S. (1992). Influences on Adolescent Sexuality in Nigeria and Kenya: Findings from recent focus group discussions. Studies in Family Planning. 23, 66-70

Best, K. (2000) many youths face grim STD risks. Network, Family Health International. 20(3): 4-9

Blane A K and Way A A. Sexual behaviour and contraceptive knowledge and use among adolescents in developing countries. Studies in Family Planning 1998; 29 (2):106-116

Brabin, L. ,Kemp, J. , Obunge, O. K., Ikimalo, J, Dolimore, N. , Odu, N.N. ,Hart, C. A. ,and Briggs, N. D. (1995). Reproductive Tract Infection among Adolescent girls in rural Nigeria. Lancet. 345 (8945): 270-271

Burnhill, M.S. , in Trieman et al. (1995). IUDs- An update. Population Reports. Series B (6)

Chiwuzie J and Akpakpan E. Female adolescent sexuality and early (unwanted pregnancy) among secondary school students in Benin, Nigeria. Nigerian Journal of Community Medicine and Primary Health Care. 2001; 13: 17 -

Cole, L. P. , Elderman, D.A. , Potts, D.M. , Aranda, C. , Behlilovic, B. , Etman, S. , Moreno, J. , and Randic, L. in Trieman et al (1995). IUDs- An update. Population Reports. Series B (6) Contraceptive Effectiveness. Accessed in 2003 at www.fhi.org/en/fp/fppubs/network/v17-1/index.html

Demographic and Health Surveys. (2001). Columbia. Institute for Resource Development / Macro International, Inc.

Demographic and Health Surveys. (2002).Columbia: Institute for Research Development / Macro International, Inc.

Ellsworth, H. (1986). Focus on Triphasil. Journal of Reproductive Medicine. 31(6) 559-564

Ellsworth, H. in Blackburn et al. (2000). Oral contraceptives- An update. Population Reports. Series A (9)

Fadiora S. O, Oboro V. O, Akinwusi P. O, Adeoti M. L, Bello T. O and Egbewale B. E. Sexual risk behaviours among universityp students in south western Nigeria. http://www.sexualhealthatters.com/v4iss1/article2.htm

Family and Adolescent Health Initiative. (1996). Sex education and adolescent sexual behaviour in Nigeria: A research proposal. Unpublished.

Fikree, F.F, Khan, A. Kadir, M.M, Sajan, F., Rahbar, M. H. (2000) What influences Contraceptive use among young women in urban squatter settlements of Karachi, Pakistan? International Family Planning Perspectives 27(3): 130-135

Fisher M, Laing J. E and Townsend J. W. (1998). Handbook for Family Planning Operations Research Design. Population Council. Washington DC

Friedman L,(1993) Youth and Risky Sexual Behaviuor. Reproductive Health Network. Fall(2),3-4

Gaspard, U.J. , Deville, J.L. and Dubois, M. (1983). In Blackburn, et al. (2000). Oral C0ntraceptives – an update. Population Reports. Baltimore. Series A (9)

Gyepi-Garbara, B. (1985). Adolescent Fertility in sub-saharan Africa. Boston Ma. Pathfinder Fund.

Harari, S.E. and Vinovskis, M. A (1993). Adolescent Sexuality, Pregnancy and Childbearing in the past. Connecticut, Yale University Press.

Harold, I. and Davis, S.L. (1998). Sexuality-related measures: A compendium. Bloomington IN, p. 213-216

Hollerbach, P.E. (1980) in Robey, B. et al (1996) Population Reports. Series J (43)

Insel D. and Roth, I. (2007) Human sexuality in a world of Diversity. Allyn and Bacon.

Jennings, V.H., Lamprecht, V.M. and Kowal, D. (1998). Fertility Awareness Methods in Hatcher et al. (2003). Contraceptive Technology. New York, Ardent Media.

Kerlinger, F.N (1993). Foundations of Behavioral Research, Holt, Rinehart and Winston, Inc. New York.

Kiragu, K. and Zabin, L.S (1995) Contraceptive use among high School Students in Kenya. International Family Planning Perspectives. 21(3): 108-112

Makinwa-Adebusoye, P. (1992). Sexual Behaviour, Reproductive knowledge and Contraceptive Use among young urban Nigerians. International Family Planning Perspectives 18(2) 16-70.

Mc Cauley, A. P and Salter, C. (1995) Meeting the needs of young adults. Population Reports, Series J, (41)

Moronkola, O.A and Idris, O.M. (2000) Sexual Health Knowledge, determinants of Sexual behaviour and use of Contraceptives among female secondary

school students in Ibadan, Nigeria. Nigerian School Health Journal. 12 (1 & 2): 27-35

Niche K and Kineme EE. Prevalence of sexual behaviour and outcome among female secondary school students in Port Harcourt. African Journal of Reproductive Health 2001; 5 (2) 63-67

Niçois D, Ladipo A O, Paxman J and Otlorin E O Sexual behaviour, contraceptive practice and reproductive health among Nigerian adolescents. Studies in: Family Planning 1986; 17(2) 100-106

Nwana, O.C. (2005). Introduction to Educational Research. Ibadan. Heinemann Education Books Limited

Oladipo, O. (1999). An Overview of Adolescent Reproductive research and interventions in Nigeria. A paper presented at the Nigerian School Health National conference on Family Life and Sexuality Education held at the Federal College of Education, Osiele, Abeokuta , November, 1999.

Ozumba BC and Amaechi FN. Awareness and practice of contraception among female students at the Institute of Management and Technology (IMT), Enugu. Public Health 1992; 106:460-461

Pachauri, S. (1996). Reproductive Health. New Age Publishers. New Delhi.

Pachauri, S. and Santhya, K.G (2002) Reproductive Choices for Asian adolescents: A focus on Contraceptive Behaviour. International Family Planning Perspectives. 28 (4): 186-194

Peterson, H.B., Xia, Z., Hughes, J.M. (1996). The Risk of pregnancy after tubal sterilization: Findings from the U.S collaborative review of sterilization. American Journal of Obstetrics and Gynaecology. 174: 461-470

Polit, F.D. and Hungler, B. P (1993). Nursing Research: Principles and Methods, J. B Lippincott Company, Philadelphia.

Rowgow, D. and Horowitz, S. (1995). Withdrawal: A review of literature and an agenda for research. Studies in Family Planning. 26(3) 140-153

Ryder, B. and Campbell, H. (1995). Natural Family Planning in the 1990s. The Lancet, 346: 233-234

Senanayake, P. (1990). Adolescent Fertility. California, Third Party Publishing.

Sikes, O. J (1993). Re-conceptualization of Population education. United Nations Technical Paper (No.2) p.50

Sivins, I. and Stern, J. (1997). Long-acting more effective Copper T IUDs: a summary of U.S experience. Studies in Family Planning 10 (10):263-281.

Tatum, H.J. , and Schmidt, F.H. in Trieman et al. (1995). IUDs- An update. Population Reports Series B (6)

The Alan Guttmacher Institute (AGI). (2001). Into a New World: Young women's Sexual and Reproductive lives. New York. AGI

Trieman, K. , Liskin, L. , Kols, A. , and Rinehart, W. (1995). IUDs- An update. Population Reports. Series B (6)

Unigbe I E and Ogbeide O. Sexual behaviours and contraceptive use among adolescent girls in Benin City, Nigeria. African Journal of Reproductive Health. 1999 ; 3 (1):39-44

United Nations Fund for Population Activity (UNFPA). (1998). The World's Women: Trends and Statistics. New York.

Uwakwe, C.(1993). Sexual Behaviour of Adolescents in Nigeria. Nigerian Journal of School Health 13 (2):147-152

WHO (1975). Pregnancy and Abortion in Adolescence. Report of a WHO meeting, Geneva.

World Health Organization (WHO) (1977). Health needs of Adolescents. Geneva WHO Technical Discussions.

World Health Organization (WHO) (1990). Young People's Health: A challenge for society. WHO Report series 731: 38-61

Zlidar, V. M., Gardener, R. R, Morris, L, Goldberg, H. and Johnson, K. (2003) New Survey Findings: The reproductive revolution continues. Population Reports, Series M (17)

## APPENDIX A
## PERMISSION TO VET QUESTIONNAIRE

Department of Physical and Health Education
Faculty of Education
Ahmadu Bello University,
Zaria,

14th July, 2006

Dr. A. A. Aliyu
Dr. Hellandendu
Prof. K. Venkateswarlu
Prof. J.A. Gwani
Dr. M. Musa

Dear Sir,

**REQUEST TO VET QUESTIONNAIRE ON KNOWLEDGE OF REPRODUCTIVE HEALTH AND CONTRACEPTIVE USE AMONG TERTIARY INSTITUTIONS STUDENTS IN NIGER STATE**

Mal. Isa Abubakar is one of my MED students in health Education. In partial fulfillment of the requirements of his MED Programme, he is conducting a research on the ON KNOWLEDGE OF REPRODUCTIVE HEALTH AND CONTRACEPTIVE USE AMONG TERTIARY INSTITUTIONS STUDENTS IN NIGER STATE.

In this regard, he has prepared a questionnaire on the basis of your professional expertise, you have been selected to critically examine the questionnaire and make necessary corrections for its improvement.

I therefore request you to kindly go through the questionnaire very critically and make your suggestions wherever necessary and return it to Mr. Isa Abubakar within a week time.

Yours sincerely,

Professor (Mrs.) C.O. Adegbite
(Major Supervisor)

## APPENDIX B
## PERMISSION TO ADMINISTER QUESTIONNAIRE FOR PILOT STUDY

Department of Physical and Health Education
Faculty of Education
Ahmadu Bello University,
Zaria,

14th September, 2006

The Director
Students' Affairs
Federal University of Technology
Federal Polytechnic, Bida
College of Education, Minna
College of Agriculture, Mokwa

Dear Sir,

**PERMISSION TO ADMINISTER QUESTIONNAIRE**

Mr. Isa Abubakar is a Master's student in Health Education in partial fulfillment of the requirements for the award of M.Ed Health Education. He is conducting a research on Knowledge of Reproductive Health and Contraceptive Use among Tertiary Institutions Students in Niger State. In this regard, he has prepared a questionnaire to be administered in your school.

I therefore request for your kind permission to allow administer the questionnaire making use of the students as his subject of study.

Thanking you for your cooperation.

Yours sincerely,

Professor (Mrs.) C.O. Adegbite
Faculty of Education
(Major Supervisor).

**APPENDIX C**
**REQUEST FOR THE COMPLETION OF QUESTIONNAIRE**
**KNOWLEDGE OF REPRODUCTIVE HEALTH AND CONTRACEPTIVE USE AMONG STUDENTS OF TERTIARY INSTITUTIONS IN NIGER STATE.**

Dear Respondent,

You are being asked to participate in the research study "Relationship between Knowledge of Reproductive Health and Contraceptive Use among Tertiary Institutions' Students in Niger State".

The purpose of this study is for the advancement of knowledge, in fulfillment of the requirement for the award of M.Ed degree in Health Education by Ahmadu Bello University, Zaria.

It is hoped that you will consent to completing the questionnaire. All information you provide will be treated confidentially and it will also not be used for any other purpose than earlier stated. To guarantee confidentiality, do not write your name on the questionnaire. Kindly answer the questions accurately and completely.

Thank you very much for your time and cooperation.

Isa Abubakar

## QUESTIONNAIRE
## SECTION A

## DEMOGRAPHIC DATA

1. What is the name of your school? .....

2. What is your sex?

   a. Male [ ]
   b. Female [ ]

3. What is your age (in years)? .....

4. What is your religion?

a. Christianity [ ]
b. Islam [ ]
c. Traditional religion [ ]
d. Others (specify) .....

5. To which ethnic group do you belong?
   a. Gbagyi [ ]
   b. Hausa [ ]
   c. Ibo [ ]
   d. Nupe [ ]
   e. Yoruba [ ]
   f. Others (specify) .....

6. What is your marital status? (Select only one)

a. Single [ ]
b. Married [ ]
c. Divorced [ ]
d. Partnered/ Living with someone [ ]

## SECTION B
## REPRODUCTIVE HEALTH KNOWLEDGE

7. Male organs of reproduction include..... (Please select only one option)

a. Vulva and clitoris [ ]
b. Fallopian tubes [ ]
c. Testes [ ]
d. Ovaries [ ]

8. Which of the following signs mark the beginning of puberty (sexual maturity) in a young male person? (select as many as apply)
   a. Changes in skin colour [ ]
   b. Deposits of fats around the hips [ ]
   c. Enlargement of the breasts [ ]
   d. Seminal ejaculations (wet dreams) [ ]

9. Which of these signs mark the beginning of puberty in a young female person? (select as many as applicable)
   a. Changes in skin colour [ ]
   b. Deposits of fats around the hips [ ]
   c. Enlargement of the breasts [ ]
   d. Seminal ejaculations (wet dreams) [ ]

10. Menstruation in girls begins before they attain puberty (select only one option)
   a. True [ ]
   b. False [ ]

11. Boys attain puberty earlier than girls of the same age
   a. True [ ]
   b. False [ ]

12. Sexual and romantic feeling is common among boys and girls who have attained puberty
   a. True [ ]
   b. False [ ]

13. Pregnancy can occur even when there is no union of sperm cell with ovum (fertilization)
   a. True [ ]
   b. False [ ]

14. Many young persons have no idea about the actual period of the female menstrual cycle when sexual intercourse is likely to result into pregnancy. From one menstrual period to the next, are there certain days when a woman is more likely to become pregnant if she has sexual intercourse?
   a. Yes [ ]
   b. No [ ]

15. If you select 'yes', when is a woman more likely to become

pregnant if she had unprotected sex with a mature male?

a. Just before her period begins [ ]
b. During her period (menses) [ ]
c. Right after her period has ended [ ]
d. Halfway between two periods [ ]
e. Others (specify) ……

16. If you select 'No', why?.....

17. Which of these actions is ***NOT*** likely to result in the occurrence of pregnancy? (select only one option)

a. Sexual intercourse while standing [ ]
b. Sexual intercourse for the first time by a mature girl [ ]
c. Sexual intercourse halfway between two periods [ ]
d. Sexual intercourse right after menses [ ]

18. Which of the following determines whether an unborn baby will be a boy or a girl?

a. Blood group of the mother [ ]
b. Genes of the parents [ ]
c. Age of parents [ ]
d. Hormones of the parents [ ]

19. Who determines the sex of the unborn baby?

a. Both parents [ ]
b. The father [ ]
c. The mother [ ]
d. The grandparents [ ]

20. Which of these statements about masturbation is correct?

a. It can lead to sexually transmitted infection [ ]
b. It is physically harmful [ ]
c. It is mentally harmful [ ]
d. It is used to achieve sexual pleasure [ ]

21. Are you aware of illnesses that can be transmitted through sexual contact called sexually transmitted infections (STI)?

a. Yes [ ]
b. No [ ]

22. If yes, to Question 21, what symptoms might a woman with STI have?

(Select as many options as applicable)

a. Abdominal pain [ ]
b. Genital discharge [ ]
c. Foul smelling discharge [ ]
d. Genital itching [ ]
e. Blood in urine [ ]
f. Burning pain on urination [ ]
g. Loss of hair around genital area [ ]
h. Don't know [ ]

23. If a man has STI, what symptoms might he have?
a. Abdominal pain [ ]
b. Genital discharge [ ]
c. Foul smelling discharge [ ]
d. Genital itching [ ]
e. Blood in urine [ ]
f. Burning pain on urination [ ]
g. Loss of hair around genital area [ ]
h. Don't know [ ]

24. Is it possible to prevent STI?
a. Yes [ ]
b. No [ ]

25. If yes, what can you do to prevent transmission of STI to your partner?
a. Avoid touching my partner [ ]
b. Use condom when having sex [ ]
c. Avoid eating with my partner [ ]
d. Others (specify) ……..

26. If no, to question 23, why? ……..

27. What is antenatal care?
a. The care given to women right after birth [ ]
b. The care given to women during labour [ ]
c. The care given to women before pregnancy [ ]
d. The care given to women during pregnancy [ ]

28. Who should attend antenatal clinic?
a. Women who are pregnant [ ]
b. Women who had just had a baby [ ]
c. Women who are in labour [ ]
d. Women who want to be pregnant [ ]

29. When is the best time for a mother to begin breastfeeding of a newborn baby?

a. Immediately after the baby is born [ ]
b. A day after the is born [ ]
c. Some days after the baby is born [ ]
d. Others (specify) …….

30. Are you aware that it is possible for couples to do something to delay or avoid the occurrence of pregnancy?

a. Yes [ ]
b. No [ ]

31. If yes, what can couples do to delay or avoid the occurrence of pregnancy? (Select as many as applicable)

| | Measures | Yes | No |
|---|---|---|---|
| A | Use medicines like antibiotics | | |
| B | Use condoms | | |
| C | Drink lime or bitter lemon | | |
| D | Use family planning pills | | |
| E | Use cervical cap or diaphragm | | |
| F | Use intrauterine device | | |
| G | Use family planning charms/juju | | |
| H | Use implants/Norplant | | |
| I | Drink salt dissolved in water | | |
| J | Periodic abstinence from sex | | |
| K | Use herbs or concoctions | | |
| L | Use family planning injection | | |
| M | Use spermicidal creams/jellies | | |
| N | Wear traditional planning rings on finger | | |
| O | Practice exclusive breastfeeding | | |
| P | Withdrawal before ejaculation | | |
| Q | Sterilization operations | | |
| R | Others | | |

32. If 'no' to question 29, why? …….

Indicate how effective each of the following methods are in delaying or avoiding pregnancy.

| S/No. | Method | Effective | Ineffective | Don't know |
|---|---|---|---|---|
| 33. | Medicines e.g antibiotics, chloroquine | | | |
| 34. | Drinking of lime and bitter lemon | | | |
| 35. | Use of condoms | | | |
| 36. | Family planning pills | | | |
| 37. | Intrauterine device (IUD) | | | |
| 38. | Cervical cap or diaphragm | | | |
| 39. | Drinking of salt dissolved in water | | | |
| 40. | Periodic abstinence from sex | | | |
| 41. | Herbs/concoctions | | | |
| 42. | Charms/juju | | | |
| 43. | Family planning injection | | | |
| 44. | Spermicidal cream/jellies | | | |
| 45. | Traditional ring worn on the finger | | | |
| 46. | Sterilization operations | | | |
| | | | | |

47. Which of the following methods of delaying or avoiding pregnancy can be used by a **man**? (Select as many as apply)
    a. Implants (Norplant) [ ]
    b. Diaphragm/Cervical cap [ ]
    c. Sterilization operation [ ]
    d. Periodic abstinence [ ]
    e. Family planning pills [ ]
    f. Condoms [ ]
    g. Family planning injection [ ]

## SECTION C
## (CONTRACEPTIVE USE)

48. Have you had sexual intercourse in the last 12 months?
    a. Yes [ ]
    b. No [ ]
    c.
49. If yes, the last time you had sexual intercourse did you use any method to avoid pregnancy?
    a. Yes [ ]
    b. No [ ]

50. If yes, what method did you use? ……

51. If no, why not? …….

52. What other method(s) have you ever used? ……

53. Which of these best describes when was the last time you used any method to delay or avoid pregnancy?

    a. Days ago [ ]
    b. Weeks ago [ ]
    c. Months ago [ ]
    d. Years ago [ ]

54. How often do you use a method to avoid pregnancy?

    a. Every time I have sexual relation [ ]
    b. Most times [ ]
    c. Few times [ ]
    d. Hardly [ ]
    e. Others (Specify) ……

## APPENDIX D

## MARKING GUIDE FOR SECTION B OF THE QUESTIONNAIRE (KNOWLEDGE OF REPRODUCTIVE HEALTH).

| Question No. | Correct option |
|---|---|
| 7. | C (Testes) |
| 8 | D (Wet dreams) |
| 9 | A, B & C |
| 10 | B (False) |
| 11 | B (False) |
| 12 | A (True) |
| 13 | B (False) |
| 14 | A (Yes) |
| 15 | D (Halfway between two periods) |
| 16 | (Open ended) |
| 17 | D (Sexual intercourse right after menses) |
| 18 | B (Genes of parents) |
| 19 | B (The father) |
| 20 | D (It is used to achieve sexual pleasure) |
| 21 | A (Yes) |
| 22 | A, B, C, D |
| 23 | B, D, F |
| 24 | A (Yes) |
| 25 | B (Use condom) |
| 26 | (Open ended) |
| 27 | D (During pregnancy) |
| 28 | A (Pregnant women) |
| 29 | A (Immediately after the baby is born) |
| 30 | A (Yes) |
| 31A | No |
| 31B | Yes |
| 31C | No |
| 31D | Yes |
| 31E | Yes |
| 31F | Yes |
| 31G | No |
| 31H | Yes |
| 31I | No |
| 31J | Yes |
| 31K | No |
| 31L | Yes |
| 31M | Yes |

| | |
|---|---|
| **31N** | **No** |
| **310** | **Yes** |
| **31P** | **Yes** |
| **31Q** | **Yes** |
| **32** | **(Open ended)** |
| **33** | **Ineffective** |
| **34** | **Ineffective** |
| **35** | **Effective** |
| **36** | **Effective** |
| **37** | **Effective** |
| **38** | **Effective** |
| **39** | **Effective** |
| **40** | **Effective** |
| **41** | **Ineffective** |
| **42** | **Ineffective** |
| **44** | **Effective** |
| **45** | **Ineffective** |
| **46** | **Effective** |
| **47** | **C, D, F** |