KNOWLEDGE OF HORMONAL CONTRACEPTIVE USE AND NUTRIENT BIOAVAILABILITY AMONG WOMEN OF REPRODUCTIVE AGE IN IBADAN NORTH LOCAL GOVERNMENT AREA, NIGERIA

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OLUKOMOGBONTEMITOPE
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B.Sc. BIOLOGY (ZARIA)
MATRIC NUMBER: 147318

A DISSERTATION SUBMITTED TO THE DEPARTMENT OF HUMAN NUTRITION IN PARTIAL FULFILMENT OF THE REQUIREMENT FOR THE AWARD OF MASTER OF PUBLIC HEALTH (POPULATION AND REPRODUCTIVE HEALTH NUTRITION) DEGREE

DEPARTMENT OF HUMAN NUTRITION
FACULTY OF PUBLIC HEALTH
COLLEGE OF MEDICINE, UNIVERSITY OF IBADAN, NIGERIA.

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CERTIFICATION

I certify that this work was carried out by OLUKOMOGBON Temitope in the department of Human Nutrition, Faculty of Public Health, College of Medicine, University of Ibadan under my supervision.

_____

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DEDICATION

This work is dedicated to the true and ever faithful God for the favor, speed and all he bestowed to make this work a reality. There is no question of your greatness. I adore you.

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ABSTRACT

Hormonal Contraceptives (HC) use among women of the reproductive age is an established method of Family Planning (FP). Hormonal contraceptives are known to affect Nutrient Bioavailability (NB) but this knowledge among users has not been well documented. This study was designed to assess effects of training on knowledge of HC use and nutrient bioavailability among women of reproductive age in Ibadan North Local Government Area, Nigeria.

A quasi-experimental study was conducted among FP clinic attendees at two tertiary hospitals: Adeoyo Maternity Hospital (AMH) and University College Hospital (UCH). A semi-structured questionnaire was used to collect data on socio-demographic characteristics, types of HC used, knowledge of the effects of contraceptives on NB and the need for nutrition counseling of 300 women attending the FP clinic of AMH. Knowledge score (KS) of FP, nutrients, and effects of HC on NB were assessed on 18-item, 25-item and 25item scales respectively. The KS below 9, 13 and 13 were considered poor for FP, nutrients and effects of HC on NB, respectively. Data were used to identify knowledge gaps and develop training manual detailing types of contraceptives, side effects, nutrients, and effects of HC on nutrients for the intervention. A one-day training intervention was subsequently conducted for a purposively selected consenting 23 out of 300 women surveyed at AMH (experimental) and 30 women from UCH (control) participants. Data were analysed using descriptive statistics and t-test at p=0.05.

Mean age of participants was 32.8±6.2 years (experimental) and 31.6±4.5 years (control). All participants were married and 56.5% (experimental) and 63.3% (control) had secondary education. Types of HC used by respondents included: Injectibles (43.5%; 36.7%), Intra Uterine Device (47.8%; 26.7%) and oral contraceptives (8.7%; 36.7%) for experimental and control groups respectively. Before training, mean KS for FP, nutrients and effects of HC for experimental group were 6.8±4.1, 15.4±6.9 and 1.96±4.0 compared with 9.53±3.3, 14.5±7.8 and 1.8±4.0 among control, respectively. After training, mean KS for experimental was 8.52±2.2, 16.9±5.4 and 8.3±4.7 as compared with 9.53±3.3, 14.5±7.8 and 1.8±4.0 among control respectively. A significant difference existed between experimental groups' pre-training and pos-training scores but not in the controls. At pre-training, 21.7% each of the experimental group and control group perceived that HC affects NB. At post-training, there was increase in knowledge of

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the experimental group from 21% to 73.9%. Pre-training test showed 87.0% of the experimental and 78.3% of the control groups admitted to the need for nutrition counseling while post-training, 1000.0% and 78.3% did so respectively. At post-training, 73.9% and 60.9% of experimental and control groups stated eating adequately was required when using contraceptives, while 100.0% and 60.9%agreed to this after training respectively.

Training intervention was effective in improving women's on the effects of hormonal contraceptives on nutrient-bioavailability. Nutrition counseling should constitute part of family planning counseling to improve knowledge on hormonal contraceptives interaction with nutrient bioavailability.

Keywords: Women of reproductive age, Hormonal contraceptives use, Nutrient bioavailability
Word Count: 497

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GLOSSARY OF ABBREVIATIONS/ ACRONYMS

ABUTH: Ahmadu Bello University Teaching Hospital

AMH: Adeoyo Maternity Hospital

BBT: Basal Body Temperature

CDC: Control for Disease Control

CICS: Combined Injectible Contraceptives

COC: Combined Oral Contraception

CPR: Contraceptive Prevalence rates

DMPA: Depot medroxyprogesterone

FDA: Food and Drug Administration

ECP: Emergency Contraceptive Pills

FP: Family Planning

HC: Hormonal Contraceptives

IEC: Information, Education and Communication

IUCD: Intra uterine device

LAM: Lactational Amenorrhea Method

LGA: Local Government Area

LNG-IUD: Levonorgestrel IUD

LNG-IUS: Levonorgestrel releasing Intrauterine System

KS: Knowledege Scale

NDHS: National Demographic Health Survey

NET-EN: Norethdrone enanthate

NB: Nutrient Bioavailability

NPC: National Population Council

OC: Oral Contraceptives

OCA: Oral Contraceptive Agents

POP: Progestin-Only Pills

RDA: Recommended Dietary Allowance

SPSS: Statistical Package for Social Science

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UCH: University Teaching Hospital

WHO: World Health Organization

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CHAPTER ONE

INTRODUCTION

1.1 Background of study

Women of today, whether belonging to the affluent society or economically backward sectors constitute major portion of world's population (Harshala and Premakumari, 2000). Women's health is of utmost importance as it reflects the health of the family (Jain and Singh, 2003). Concerns about women's health related to maternal morbidity and mortality has made discussions on fertility intentions and contraceptive preferences paramount (Cleland, 2009).

Hormonal agents are the most popular and most effective non-surgical methods of contraception in the world (CDC, 1987). The most popular of these methods is the combined oral contraceptive pill, although in Nigeria and Africa as a whole, the injectable hormonal contraceptives are very popular especially among clients seeking terminal contraception (CDC, 1987; Fakeye, 1992; NDHS, 2008).

Researchers have indicated a growing concern for those using contraceptives (Norris and Ellerston, 2002; Carolyn, 2005) and much of these researches has focused on the possible changes in general health and nutritional needs of women using contraceptives. However, in recent years, their use has been associated with some undesirable metabolic and haemostatic changes (Norris and Bonnar, 1997). Apart from their gynecologic influence, the hormones have been shown to affect a number of metabolic and nutritional processes, some advantageously and others disadvantageously (Webb, 1980).

The body naturally produces hormones to regulate many metabolic functions and women who use contraceptives have an increased amount of hormones and there are questions about whether they need different amounts of vitamins and minerals. The vitamins in question include vitamin B-6, folic acid, riboflavin, vitamin C and vitamin A. Minerals include iron, zinc and copper (Anderson, 1998; Fitzgerald, 2010). Still effects on vitamin and mineral status have received much less attention (Christopher, Christopher and Ann, 2002).

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Most research has focused on the levels of these vitamins and minerals in the blood of women who take oral contraceptives and compared to women who do not. It is difficult to draw definite conclusions because blood analyses are not always the most accurate or sensitive measure of changes in nutritional status (Anderson, 1998 and Fitzgerald, 2010).

Nutrients enhance the functioning of the endocrine gland which leads to the proper regulation of hormones that rules the functioning of the reproductive system but once they are deficient the endocrine gland is affected and the reproductive system will be affected because the hormones will be poorly regulated.

Women whose diets are not adequate will only aggravate or worsen nutritional problems with birth control pills. The best general advice for a woman on birth control pills is to plan a diet that regularly includes moderate amounts of a variety of foods, including good sources of the vitamins and minerals. An increased risk of the nutritional implication of contraceptives and other forms of cardiovascular disease is concentrated in women with recognized risk factors, such as smoking and hypertension (Hannaford, 2009).

Concern over the knowledge of women on the nutritional implication of hormonal contraceptives prompted this study. With the rise in the use of contraceptives and level of malnutrition in Nigeria and women being listed as part of the vulnerable group, there is a need to assess the knowledge of women on the nutritional implication of hormonal contraceptives and thus educate them on how to attain a nutritionally healthy life while using hormonal contraceptives.

1.2 Problem Statement

Eight to 10 million women in the United States and up to 100 million women worldwide take hormonal contraceptives (HCs) for birth control (Dale, 2006**)**.

The prevalence of contraceptive pills, injectibles and Intra uterine devices in the United States is 15.6%, 2.1% & 0.7%, in the United Kingdom it's 22.0%, 3.0%& 6.0% and in Canada its 14.4%, 0.0% and 2.9%, respectively. While across Africa, the prevalence of the pills, injectibles and Intra-uterine device are 10.6%, 23.25 & 1.8% in South Africa, 5.5%,

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6.4% & 0.9% in Ghana and 1.8%, 2.0% & 0.7% in Nigeria, respectively (United Nations Department of Economic and Social Affairs, 2008).

Fertility control has been used for thousands of years in different forms and in the mid-1980s; the Nigerian government t launched a national population policy (Federal Republic of Nigeria, 1988; Pearce, 2001) which was reviewed again in 2004 (NPC, 2004).

In Nigeria, over an 18-year period, contraceptive prevalence increased from 6 percent in 1990 to 15 percent in 2008. Use of modern methods increased from 4 percent in 1990 to 10 percent in 2008. The largest increase was in the use of injectables, from 1 percent in 1990 to 3 percent in 2008. Injectables (3%) are one the most commonly used methods. The overall contraceptive prevalence among all women in Nigeria is 15 percent (NDHS, 2008).

According to several surveys carried out in Nigeria, 1990, 2003 & 2008 there has been an increase in the use of oral contraceptives (1.2,1.8 - 1.7) and injectibles (0.7, 2.0 - 2.6) and IUCD in recent times (NDHS, 2008).

In recent years, the use of contraceptives has been associated with some undesirable metabolic and haemostatic changes (Norris et al., 2002) and women are usually not advised on these side effects and thus have a poor knowledge of the nutritional implication of oral contraceptives and injectibles.

Even the Food and Drug Administration (FDA) advises any woman who takes birth control pills to request from her doctor, druggist or health department, a government pamphlet that explains in greater detail the uses, benefits and risks of birth control pills (Anderson, 2008).

At present, there is no conclusive evidence to show that women who take birth control pills need different amounts of vitamins and minerals to prevent nutritional deficiencies. However, this generalization assumes that women who take birth control pills have adequate diets (Anderson, 2008).

One African study found that women who receive inadequate counseling about side effects are more likely to become family planning dropouts when they experience side effects, while those who are fully counseled on side effects are likely to continue contraception with

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the same method or a different, more acceptable method (Cotton, Stanback,, Moadouka, Taylor-Thomas and Turk, 1992).

1.3 Rationale of Study

Misconceptions exist in terms of the nutritional status of women using oral contraceptives and injectibles (Ross, 2009) and there are about 100 million women world wide that currently use birth control methods especially the pills. Despite the deep acceptance of these methods one can not belittle the urgent matter of monitoring the safety of these types of medications. Therefore these products actually deserve much attention (Swanson, 2009).

The attitudes and views of women, the primary users of family planning methods should be considered important when it comes to contraceptives (Stephenson and Tsuii, 2002). Women's knowledge or education about what affects them, awareness about the role of family planning in family life as well as access to safe and effective methods of family are essential to good health (Akande, 2000).

This study would shed more light on the importance of counseling with respect to choice of contraceptives and will reinforce the need to find out which contraception best suits an individual and why. Furthermore it will buttress the side effects of contraceptives and bring to the attention of people the nutritional implications of hormonal contraceptive use, the importance of feeding adequately and the need for nutrition counseling while on contraceptives.

Oyo state was chosen for this study because the South West zone has the highest proportion of women currently using a family planning method (32 percent), followed by South South zone (26 percent) (NDHS, 2008). Ibadan metropolis was also considered best for the location for which to carry out this study owing to the fact that contraceptive use among women in urban areas is three times that of women in rural areas (26 and 9 percent, respectively) (NDHS, 2008).

In Nigeria there is a dearth of information as regarding the knowledge of the effect of hormonal contraceptives on the nutrient metabolism of women taking them. Therefore this study seeks to answer some questions to improve the knowledge base of the women using contraceptives.

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1.4 Study Objectives

1.4.1 Broad Objective

To promote the safe use of contraceptives by providing additional information on nutritional implication of their usage.

1.5 Specific Objectives

1. To ascertain the pattern and types of contraceptive use among study participants.
2. To assess and document the baseline result of the knowledge of study participants on the effects of contraceptives on nutrient utilization.
3. To document the effect of training on knowledge of contraceptives on nutrient utilization.
4. To identify respondent's view on the need for nutrition counseling and education at family clinics.

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CHAPTER 2

LITERATURE REVIEW

2.1 Introduction

This literature review will examine what other studies have already established on contraceptive use and what is known about the nutritional implication of their use. The study within this review of literature focuses on objectives 1, 2, 3, 4 and 5 as set out in sub-section 1.5 of the introductory chapter. Objective 3 will be derived as a result of the findings from objectives 1and 2. The other objectives; 4&5 will be met through the vehicle of data collection and analysis.

By exploring the objectives of this study via literature, a significant contribution will be made to this research. Contraceptives, primarily the hormonals, their benefits and side effects; the factors affecting contraceptive use will be evaluated. Knowledge of reproductive aged women on family planning, types of nutrients and the likely nutritional effects of contraceptives will be assessed. Importantly, nutrition education and counseling will be examined in terms of its relevance to family planning services provided. In effect, the value of studying the aforementioned literature areas will be to provide a meaningful discussion and analysis of hormonal contraceptive use, in a prearranged way, to facilitate a critical understanding of the implication of its use on nutrient bio-availability and how nutrition education can help provide additional information to contraceptive users to ensure a safe use of contraceptives thereby promoting health.

At the end of this major section it is hoped that a vital understanding of key issues is demonstrated, that any reader will be better informed in these areas and that there will emerge a clear focus, and justification, for research to determine the knowledge of women on the nutritional implications of hormonal contraceptives.

2.2 Hormonal contraceptives

Hormonal contraceptives: are birth control methods that act on the endocrine gland. They are made up of female sex hormones: estrogen and progestin (a synthetic form of progesterone) (Health communities.com). Hormonal contraceptives are contraceptives that contain synthetic hormones, similar to the hormones produced naturally by the body and

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they work by releasing these hormones and preventing ovulation by causing changes in the mucus in the cervix and changes in the endometrium.

These hormones may be taken orally (taken by mouth), implanted into body tissue, injected under the skin, absorbed from a patch on the skin, or placed in the vagina. Using both hormones together is somewhat more effective than progestin alone, but the estrogen component is responsible for most of the serious health hazards associated with hormonal methods (Contracept.org, 7th April 2011).The mode of delivery determines whether the hormonal exposure is continuous or intermittent (MedicineNet.com, 2011). The original hormonal method—the combined oral contraceptive pill—was first marketed as a contraceptive in 1960 (Junod and Marks, 2002).

These hormonal contraceptives include: oral contraceptives, intrauterine device, injectibles, vaginal rings, patches and implants. They are extremely popular due to their ease of use and efficacy (Contracept.org, 2011). This study only considered 3 of the hormonal contraceptives: the oral contraceptive, injectibles and intrauterine device.

Oral Contraceptive pills

Oral contraceptives are pills taken by mouth (orally) by women to prevent pregnancy from occurring and works primarily by inhibiting ovulation. Oral contraceptives may either prevent the ovary from releasing an egg into the uterine tubes or cause changes in the cervix or uterus, making it difficult for sperm to enter the uterus or implant a fertilized egg in the uterus (Goldzieher, 1994). Oral contraceptives agents (OCA) have been in use for more than two decades, and at the present time, over 100 million women around the world are using oral contraceptive pills. Many more have used OCAs at some time in their lives (Population Reports, 2000). Oral contraceptives (OC) represent a convenient, effective, and relatively safe method of fertility control, and are also used in the treatment of gynaecological disorders relating to ovulatory and menstrual dysfunction. However, in recent years, their use has been associated with some undesirable metabolic and haemostatic changes (Norris et al., 2002). They may either contain synthetic forms of both oestrogen and progestin or progestin alone. Oral contraceptives (OC) are the most efficient method of contraception and it is the most prescribed by doctors in developing countries (Jose, Dorea and Edina, 1998).

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(i) Combined Oral Contraception (COCs): contains two synthetic steroid hormones oestrogen and progestin like the natural hormones progesterone and oestrogen in a woman's body. This is the most widely used form of oral contraceptive. Most COCs come in 21-pill and 28-pill packages. "Everyday" pills contain 28 pills in the packet, 21 of which are monophasic pills while the remaining 7 contain no hormones but often times, haematinics. Monophasic pills provide a constant dose of hormones while multiphasic pills provide changing doses of hormones. These monophasic pills reduce the number of periods per year by adding additional weeks of hormones to delay hormone withdrawal periods. They work primarily by preventing the release of eggs from the ovaries (ovulation). Possible side effects include irregular menstrual bleeding, breast tenderness, dizziness, headaches, nausea, depression, and weight gain. When no pill-taking mistakes are made, less than one pregnancy per 100 women on COCs over the first year (3 per 1000 women). OCs is generally well tolerated, but some women experience side effects, such as headache, nausea, breast tenderness, and weight gain.

Progestin-Only Pills (POPS) – are hormonal pills that contain very low doses of progestin like the natural hormone progesterone in a woman's body. They are also referred to as "mini pills". Progestin produces fewer metabolic side effects than oestrogen and progestin combined and therefore may be useful in cases where the combined pill is contraindicated i.e. heart attacks, stroke, or blood clots and during breastfeeding and by women who cannot use methods with oestrogen. It works primarily by thickening the cervical mucus (this blocks sperm from meeting the egg) and disrupting the menstrual cycle by preventing the release of egg from the ovaries. Progestin-only oral contraceptives must be taken at the same time every day. Common side effects include changes in bleeding pattern, breast tenderness, dizziness, headaches, nausea, mood changes and abdominal pain. When taken everyday by breast feeding women, less than one pregnancy per 100 women using POPs over the first year (3 per 1000 women) while for non breast feeding women taking pills at the same time less than one pregnancy per 100 women using POPs over the first year (9 per 1000 women).

Injection

Depot medroxyprogesterone acetate is the most studied injectable contraceptive and also one of the most effective methods of contraception currently available. It is reversible, its

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use is independent of intercourse, and can be provided by trained non-medical staff making it particularly suitable for use in developing countries (Aniekan, Abasiattai, and Edem, 2010). Injectable contraceptives are hormone therapies given by injection into a muscle in the upper arm or buttocks. They are monthly hormone shots and fertility returns after the injections are discontinued and the injected completely metabolised and excreted. Similar to birth-control pills, injectable birth control prevents pregnancy by preventing ovulation and thickening of cervical mucus hence making it unfavorable for sperm penetration (Dale, 2006).

The injectable progesterone-only contraception is one of the most successful means of contraception in the world today (Reshi, 2009). They were introduced to avoid the side effects of estrogen, and their use has substantially increased in the last two decades. Currently, several reports indicate that they have become the third most commonly used contraceptive method in the developing world (Zildarum, Gardner, Rustein, Morris, Goldberg and Johnson, 2003).

The two main progestogen-only injectables are depot medroxyprogesterone acetate (DMPA) and norethisterone enantate. Depot medroxyprogesterone acetate is the most commonly used and thoroughly studied injectable contraceptive (Szarewski, 2000). It was developed by the Upjohn Company in 1954 for the treatment of endometriosis and habitual abortion. However, in the early 1960s, it was noticed that females receiving it subsequently had a marked delay in return of fertility that led to its development as a fertility regulating agent (D'Arcangues and Snow, 1999).

An injection of depot medroxyprogesterone acetate (DMPA) provides protection against pregnancy for 3 months. DMPA is a type of progestin. Injections must be given every 3 months by a health care provider, and you must get the injection on time. The first one usually is given within the first 5 days after the start of your menstrual period. This timing is to ensure that you are not already pregnant and to prevent ovulation during the first month of use. The success rate for women using DMPA is 99.7% (Health communities.com)

After a woman stops DMPA injections, fertility returns in about 10 months. For some women, it may take longer. If one wants to become pregnant within the next year or two

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another form of birth control should be chosen. This first progestogen-only contraceptive was introduced in 1969: Depo-Provera, a high-dose progestin injection (Leary, 2002)

Another, shorter-acting injectable hormone, norethdrone enanthate also known as Noristerat and syngestal, is injected at a higher dose every 2 months (Health communities.com). Average daily return of fertility after NET-EN is stopped is a month or longer. Also works by preventing ovulation. Same effectiveness and side effects as DMPA although NET-EN affects bleeding less than DMPA. (NET-EN users have fewer bleeding patterns in the first 6 months and less likely to have no monthly bleeding after one year than DMPA users).

There is also the monthly Injectibles –which contains two hormones progestin and oestrogen and it's called Combined Injectable Contaceptives (CICS) and the injection. Injections are given monthly intramuscularly into the upper arm, hip, buttocks or outer thigh. It also works primarily by preventing ovulation. When taken on time, less than one pregnancy per100 women over the first year (5 per 10,000 women). There is return of fertility at an average of about one month or longer than with most other methods.

Studies have shown, disruption of regular menstrual cycles and amenorrhea are the most common side effects of DMPA (Okpani and Kua, 2002) and are also the most common reason for their discontinuation (Tolley, Loza, Kafafi and Cummings, 2005). Nearly all women experience some changes in their menstrual pattern, usually more frequent or prolonged bleeding initially, and infrequent bleeding or amenorrhea after two years of use. The menstrual changes associated with DMPA are rarely of medical concern and good counseling prior to administering the contraceptive agent increases acceptability and minimizes discontinuation (Finger, 1995).

Benefits

Injections may be good for women who find daily birth control methods inconvenient. In addition to preventing pregnancy, the injection may have other benefits. It may reduce the risk of cancer of the uterus. For women who have migraines related to their menstrual periods, this method may decrease their frequency. The injection can be used by women who are breastfeeding.

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Risks

Many women and teenagers have a decrease in bone density while using hormonal injections. Bone loss can be a concern for teenagers because they are still building their bone density, and taking injections can keep that from happening. Bone density appears to return to levels that are normal for the woman's age when the injections are stopped. It is hard to predict the risk of future fracture from the use of injections, and little research has been done. Women should weigh the possible risk of fracture against the real risk of pregnancy.

Women who have multiple risk factors for cardiovascular disease, like smoking, older age, or diabetes, may be at increased risk of cardiovascular disease while using the DMPA injection. This increased risk may last for some time after the method is stopped. Women with a history of stroke, vascular disease, or high blood pressure also may be at increased risk of cardiovascular disease while using this method.

Side Effects

DMPA injections tend to cause irregular bleeding during the first 6–9 months of use. Bleeding may be heaver, lighter, or unpredictable. After a while, monthly bleeding may not occur at all. Of the women who use injections for 1 year, about half no longer has any bleeding. When injections are used for longer than 2 years, about 70% of women do not have any bleeding. This side effect can be helpful to women who have heavy bleeding or other menstrual problems.

Another possible side effect is weight gain. More than 60% of women report a weight gain of 5 pounds during the first year of using the injection. One may continue to gain a small amount of weight each year with the use of the injection.

Other possible side effects include the following:

- Headaches
- Nervousness
- Dizziness
- Weakness or fatigue

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- Hair loss

Intra- uterine Devices (IUDs)

An intrauterine device usually is a plastic frame inserted into a woman's uterus (womb) through the vagina and cervix by a specifically trained health care provider. Almost all brands have one or two strings or threads tied to them. The strings hang through the opening of the cervix into the vagina. The user can check that the IUD is still in place by touching the strings. IUDs are also called IUCDs (Intrauterine contraceptive device). There is no delay in the return of fertility after an IUD is removed. They are one of the most effective ad long lasting methods and may either be copper-bearing or hormone releasing intrauterine device.

(i) Copper-Bearing IUD – is a small, flexible plastic frame with copper wire or copper sleeves around it. Works primarily by causing a chemical change that damages sperm and egg before they can meet. Examples include Copper T, Nova T, TCU—380A, and MLCu375 (Multiload). The type now most widely used is TCU-380A. It is quite effective i.e less than I pregnancy per 100 women using IUD over the first (6-8 per 1000 women). Common side effects include prolonged and heavy monthly bleeding, irregular bleeding, more cramps and pain during monthly bleeding. Complications such as infection, puncturing (perforation) of the wall of the uterus by the IUD or instrument used for insertion have been reported, although rarely.

(ii) **Levonorgestrel IUD (LNG-IUD) –** is a T-shaped plastic device that steadily releases small amounts of Levonorgestrel (a type of progestin). Also called the Levonorgestrel- releasing intrauterine system (LNG-IUS) or hormonal IUD. It works primarily by suppressing growth of the lining of the uterus (endometrium). It is effective with less than 1 pregnancy per 100 women using LNG-IUDs over the first year (2 per 1,000 women) (Luukkainen et al., 1994). Common side effects include changes in bleeding patterns including infrequent bleeding, fewer days of bleeding and irregular bleeding; acne, nausea, headaches, weight gain, dizziness and mood changes. Other possible physical change is ovarian cyst. About 20% to 50% of users become amenorrheic within the first 2 years after insertion (Hidalgo, Bahamondes, Perrotti, Diaz, Dantas-Monteiro and petta, 2002)

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2.3.0 Family planning

Family planning is regarded as an important preventive measure against maternal and child mortality and morbidity (WHO, 1992). Family planning enhances the quality of life by reducing infant mortality, improving maternal health, and alleviating pressures on governments to meet social and economic needs. It is a self imposed discipline by husband and wife in order to be healthy, wealthy and happy and at the same time contributing to social welfare, national progress and world peace at large (Kazi, 2006). Review of literature shows that the advantages of proper family planning are enormous as high fertility rate has been linked with underdevelopment in developing countries (Obisesan, Adeyemo and Fakokunde, 1998).

The objective of family planning services is to encourage couples to take responsible decisions about pregnancy and to enable them achieve their wishes with regard to: preventing unwanted pregnancy, securing desired pregnancy, spacing pregnancies, limiting the size of their family and ultimately promoting responsible parenthood, controlling the population and improving the quality of life of the people (Ruterberg, Ayad, Ochoa and Wilkinsm, 1991).

Family planning helps everyone (women, children, men, families, nations, and the earth). Specifically, it protects women from unwanted pregnancies, thereby saving them from high risk pregnancies or unsafe abortions. If all women could avoid high-risk pregnancies, the number of maternal deaths could fall by one-quarter. Also other benefits accruing from family planning methods include prevention from cancers, sexually transmitted infections and HIV/AIDS (Hatcher, Rinehart, Blackburn and Geller, 1997). Family planning ensures reduction in health risks of women, and gives them more control over their reproductive lives. With these gains, women can take advantages of education, employment and civic responsibilities (Akande, 2007, CDC 2000).

Family Planning is a cost-effective way to save the lives of women and children, and it empowers families to determine the optimal timing and spacing of births. It is estimated that family planning could prevent as many as one in every three maternal deaths and one in every 11 child deaths by allowing women to delay motherhood, space births, avoid unintended pregnancies and abortions, and stop childbearing when they have reached their

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desired family size (Cleland, Bernstein, Ezeh, Faundes, Glasier and Innis, 2006). Family planning is also essential to achieving the Millennium Development Goals (Cleland et al., 2006; Pott et al., 2007; Angeles et al., 2005).

2.3.1 Source of family planning information

Good reproductive health depends largely on how well informed people are on contraception issues (Tountas, Creatsas, Dimitrakaki, Antoniou and Boulamatsis, 2004). One of the factors which might affect efficacy of family planning counselling, is the source of information or the counsellor. It has been reported that the most adequate source of information on family planning is the general practitioner (Van lausen, Arnolds and Van Maris, 1994) but other sources of information on this topic have also been cited (Tountas et al., 2004; Virjo, kirkkola, Isokoski and Mattila , 1999).

A particular study shows about 60% of women in that study got their family planning information from health workers suggesting that may be one of the good results of publicity, education and regular work in family planning by health workers. It was also observed that very few respondents got information about contraception from the news media. Therefore it was assumed that the mass media has not been of much assistance in the dissemination of family planning (Onwuzurike and Uzochukwu, 2001; Ikechebelu, Joe-Ikechebelu and Obiajulu, 2005).

2.3.2 Family planning and side effects

Studies have shown that the main reason women give for dissatisfaction with family planning methods was side effects. A study carried out in Kassala, eastern Sudan observed same that side effects (6.14%) alongside some other factors were the common reasons for non- use of family planning (Abdel, Duria, Rayis, Mona and Ishag, 2011). It was also observed in another study, that women's decision about use, non-use or discontinuation of family planning methods can be affected by their perceptions of contraceptive risks and benefits, concerns about how side effects may influence their daily lives and assessment of how particular methods may affect relationships with partners or other family members (Marchant, Mushi, Nathan, Mukasa, Abdulla, Lengeler and Schellenber, 2004; Ndong and Finger, 1998).

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A study carried out in Enugu state Nigeria revealed that women in the study not satisfied with the method they were using, said side effects (71.4%) and inconvenience were the main reasons for their dissatisfaction (Onwuzurike et al., 2001). This was supported by a study carried out in Ibadan where the perceived constraints to the use of family planning methods included husband's opposition, fear of complications and perceived insufficient knowledge about family planning methods (Obisesan et al., 1998).

The above mentioned were further re-enforced by the observations of a study conducted among the Kanuris in Nigeria where findings revealed that few Kanuri women used modern methods of family planning, the barriers being objection by their husbands, the fear of delayed return to fertility, damage to the reproductive apparatus and the belief that modern contraception was introduced to reduce Muslim populations (Mairiga, Kullima, Bako and Kolo, 2010).

2.3.3 Knowledge of women on family planning

Knowledge of family planning is on the increase as supported by studies. For instance a study carried out among women in the South –eastern part of Nigeria identified the knowledge of women on family planning was high (80%) (Ikechebelu et al., 2005). Despite the high potential demand for family planning services as revealed in Nigeria's demographic and health survey (NDHS, 2008), the contraceptive prevalence rates (CPR) are low among married couples (Udigwe, Udigwe and Ikechebelu., 2002; NDHS, 2008).

Knowledge of family planning is based on the awareness of keeping family within limits through means such as contraceptives. It has to do with the ability to mention birth control methods and side effects. In Nigeria, in the year 1990, only 68.6 percent of currently married women knew any method of contraception; by 2003, this proportion had grown to 90.7 percent only to drop slightly to 87.1 percent in 2008. Similarly for men it increased from 90.6 percent in 1999 to 95.9 percent in 2008 (Jean, James, Elizabeth, Illene, David, Blessing and Micheal, 2011). About 7 in 10 women in Nigeria know at least one modern method of contraception. Male condoms, the pill, and injectibles are the most well known methods, with more than 50% of women recognizing each. Almost all (95%) sexually-

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active, unmarried women know a method compared to only 68% of currently married women (NDHS, 2008).

2.3.4 Benefits of family planning

Benefits of family planning include limiting of family size, child spacing, prevention of unwanted pregnancy and prevention of sexually transmitted diseases (Ikechebelu et al., 2005). In Nigeria, studies have shown the top three family planning benefits are - control of family size, child spacing and prevention of unplanned pregnancy (Etuk and Ekanem, 2003; Adeleye, Akoria, shuaib and Ogholoh, 2010). One possible explanation is that these benefits readily come to mind, especially given the semantics of the term ”family planning” and the direct effects of the methods. It may also reflect the emphasis placed on these benefits during health talk sessions at antenatal clinics. The knowledge of the benefits of family planning is therefore central to the understanding of family planning needs of women and families. (Adeleye et al., 2010).

Another study carried in Nigeria, observed that majority of the respondents had knowledge of the benefits of family planning as 92.2% asserted it allows couple prepare for child bearing, 90.7% affirmed it enables parents give sound education to children, 96.0% said it improves standard of living, 96.7% reasoned that it helps mother regain her strength before next baby, 86.2% noted it helps a woman to make her beauty last, 92.2% said it makes couples to be responsible while 91.3% opined that health of children are protected when women plan their families (Moronkola, Ojediran and Amosu, 2006).

Benefits to women and children (e.g., the reduction in maternal and child morbidity and mortality) are major reasons for promoting the use of modern family planning methods (Jokhio, Winter and Cheng, 2005; Royce, 2006; Singh, Darroch, Ashford and Vlassoff, 2009).

2.4 Types of contraceptives

A contraceptive is a drug, device or practice that can be used to prevent a woman from becoming pregnant (Hornby, 2001). Contraceptives have been used for thousands of years throughout human history. Traditional methods practiced in the past include a man

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withdrawing his penis from the female's vagina before ejaculation or spilling his semen on the ground (Bullough and Bullough, 1990), drinking of concoctions made from various kinds of roots, weeds, trees, leaves or substances such as infusion of gun-powder, froth from camel's mouth and deadly poisons like arsenic; abstaining from sexual intercourse for long periods, avoiding the moon or sun at different periods, wearing of charms made with dead spiders, a child's tooth and rings on fingers (Delano, 2005). In some cultures, it was believed that pregnancy can be prevented by a woman who jumps up and down or blows her nose very hard immediately after sexual intercourse (Potts and Campbell, 2002; PPFA, 2002). Unfortunately, the modes of action and effectiveness of most traditional methods are unknown (Delano, 2005).

The knowledge of the anatomy and physiology of the human reproductive system, menstrual cycle and conception made room for a better understanding of how pregnancy can be prevented, leading to breakthroughs in modern contraceptive technology (Delano, 2005). This was to develop effective, non-injurious, reliable, easily accessible and reliable methods to meet the needs of individuals and couples (PPFA, 2002). According to WHO and CCP (2007), there are a variety of modern contraceptive methods with different effectiveness rates. These include following:

(A) The Permanent methods

The permanent methods provide lifelong contraception and are not reversible. They are effective and usually intended for men and women who do not want to have children or more children. The permanent methods of contraception available are:

1. Female Sterilization – this involves a surgical procedure to tie and cut off the fallopian/ uterine tubes of the female so that eggs released from the ovaries cannot move down the tubes where they can meet sperm. It is also called tubal litigation, voluntary surgical contraception and bi-tubal ligation.

2. Vasectomy – is the tying and cutting of each of the tubes (vas deferens) that carries sperm to the penis. It works by closing off each of the vas deferens, keeping sperm out of semen. Semen is ejaculated normally but it cannot cause pregnancy. It is also called male sterilization and male surgical contraception.

(B) The non-permanent methods

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These are methods that are reversible i.e fertility can be achieved when method is not used or after a period of time when it is discontinued. These methods include:

a) Male condom

The male condom is a sheath commonly made of thin rubber latex, worn over an erect penis to prevent ejaculated sperm from entering the vagina during sexual intercourse. They are usually lubricated with water soluble lubricants and designed for one-time use. Also called rubber, raincoats and known by many different brand names. Provide an effective protection against pregnancies and STIs including HIV. Effectiveness depends on the user. Risk of pregnancy is greatest when they are not used with every act of sex. When used correctly, about 2 pregnancies per 100 women whose partners use male condom over the first year.

b) Female condom

The female condom consists of a lubricated polyurethane (plastic) sheath shaped somewhat like the male condom. The closed end has a flexible ring that is inserted into the vagina while the open end is left on the outside. It is also intended for one time use only. The female condom prevents semen from getting into the vagina. Female condoms reduce the risk of infection with STI's including HIV when used correctly with every sexual act. When used correctly with every act of sex, about 5 pregnancies per 100 women using female condoms over the first year.

c) Diaphragm

The diaphragm is a soft latex cup that is inserted into the vagina before intercourse to cover the cervix. The rim contains a firm flexible spring that keeps it in place. They come in different sizes and requires fitting by a specifically trained provider. It works by blocking the sperms from entering the cervix. Common side effects include irritation in or around the vagina or penis. When used correctly with every act of sex, about 6 pregnancies per 100 occur in women using diaphragm with spermicides over the first year.

d) Cervical cap

The cervical cap is a soft, deep, plastic rubber cup that snugly covers the cervix. Comes in different sizes; requires fitting by a specifically trained provider. The cervical cap works by

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preventing sperm from entering the cervix. When used correctly with every act of sex, about 20 pregnancies per 100 women using cervical caps over the first year.

e) Spermicides

These are sperm killing substances inserted deep into the vagina, near the cervix before sexual intercourse. Nonoxynol-9 is the most widely used. Available in foaming tablets, melting or foaming suppositories, can of pressurized foam, melting film, jelly and cream. They can be used alone or with a diaphragm or with condoms. It is one of the latest effective methods. Effectiveness depends on the user. The risk of pregnancy is greatest when they are not used with every act of sex. When used correctly with every act of sex, about 18 pregnancies per 100 women using spemicides over the first year. Side effects include irritation in or around the vagina or penis.

f) Oral Contraceptive pills

Oral contraceptives are pills taken by mouth (orally) by women to prevent pregnancy from occurring. They may either contain synthetic forms of both oestrogen and progestin or progestin alone.

(i) Combined Oral Contraception (COCs)
(ii) Progestin-Only Pills (POPS)

g) Emergency contraceptive Pills (ECPs)

These are pills taken to help prevent pregnancy occurring 72 hours after unprotected sexual intercourse (they are to be taken as soon as possible after unprotected sex). They are sometimes referred to as morning after pills or post-coital contraceptives. They may contain progestin alone or a progestin and an oestrogen. They work primarily by preventing or delaying the release of eggs from the ovaries (ovulation) and do not work if a woman is already pregnant. Common side effects include nausea, fatigue, abdominal pain, headaches, breast tenderness and vomiting.

h) Injectibles

These are hormonal preparations that are given by injection into the muscle (intramuscular injection). They may either contain synthetic forms of either progestin alone or both oestrogen and progestin.

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(i) Progestin-Only Injectibles

- Depot medroxyprogesterone acetate (DMPA)
- Norethisterone enanthate (NET-EN)

(ii)Monthly Injectibles

i) Implants

These are small plastic rods or capsules, each about the size of a matchstick, that release a progestin like the natural progesterone in a woman. The types of implants now available are:

(i) Jadelle – 2 rods, effective for 5 years.

(ii) Implanon – 1 rod, effective for 3 years.

(iii) Norpalnt – 6 capsules, effective for 5 to 7 years

(iv) Sinoplant – 2 rods, effective for 5 years.

Implants work primarily by thickening the cervical mucus (this blocks sperm from meeting an egg) and disrupting the menstrual cycle, including preventing ovulation. They are one of the most effective and long lasting contraceptive methods i.e less than one 1 per pregnancy per 100 women using implants over the first year (5 per 10,000 women). This means that 9,995 of every 10,000 women using implants will not become pregnant. There is no delay in the return of fertility after implants are removed. Common side effects include changes in bleeding patterns, weight gain, breast tenderness, headaches, dizziness, and mood changes, less sex drive, abdominal pain, acne and nausea. Other possible physical changes include enlarged ovarian follicles.

j) Intra- uterine Devices (IUDs)

- Copper-Bearing IUD
- Levonorgestrel IUD (LNG-IUD)

k) Lactational Amenorrhea Method (LAM)

A temporary method based on the natural effect of breastfeeding on fertility. ("Lactational" means related to breastfeeding while "amenorrhea" means not having monthly bleeding/ menses). Method works primarily by preventing the release of eggs from the ovaries.

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Frequent breast feeding temporarily prevent the release of the natural hormones that cause ovulation. To be effective, the LAM requires 3 conditions that must all be met:

- The mothers monthly bleeding has not returned.
- The baby is fully or nearly fully breastfed and is often, day and night.
- The baby is less than 6 months old.

Fully breastfeeding involves exclusive breastfeeding (infant receives no other liquid or food, not even water in addition to breast milk) and nearly fully breastfeeding but majority of the feedings are breast milk (more than three-fourths of all feed). When used correctly, less than 1 pregnancy per 100 women using LAM in the first 6 months after childbirth. Return of fertility is dependent on how much the woman continues to breastfeed.

l) Fertility Awareness/ Natural Methods

Fertility awareness means that the woman (or man as the case may be) knows how to tell when the fertile time of the menstrual cycle starts and ends. They are sometimes called periodic abstinence or natural family planning. There is no delay in the return of fertility awareness after fertility awareness methods are stopped. Fertility awareness methods can be classified as Calendar-based methods and symptoms- based methods:

i) Calendar –based methods – involves the use of calendar to keep track of the days of the menstrual cycle, to tell when the fertile time begins and ends. Examples are:

- **The standard day's method –** women using this method are provided with Cycle Beads TM as a visual aid to help them identify their cycle length, day of the cycle and the fertile days of the cycle. It is for use by women with cycles between 26 and 32 days long. The first day of the menstrual bleeding is counted as day 1 of the menstrual cycle. The cycle beads is comprised of a string 3 colored coded beads – a red bead represents the first day of the menstrual cycle, brown beads represent days when pregnancy is most unlikely and white beads represents the fertile days. It identifies days 18 to 19 of the cycle as fertile (Robert, 2008).

- **Calendar Rhythm method –** women using this method record the number of days in each menstrual cycle for at least 6 months. The woman subtracts 18 from the length of her shortest recorded cycle. This tells her the estimated day of her fertile time. Then she

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subtracts 11 (eleven) days from the length of her longest recorded cycle. This tells her the estimated last day of her fertile time. Sexual intercourse is avoided during the fertile time.

ii) Symptoms- based methods

These methods depend on observing signs of fertility such as changes in cervical secretions and basal body temperature. Examples of symptoms-based methods are:

- **Two Day Method –** the woman checks for cervical secretions every afternoon and/or evening on fingers, underwear or tissue paper or by sensation in or around her vagina. As soon as she notices any secretions of any type, color, or consistency, she considers herself fertile that day and following day.

- **Basal Body Temperature (BBT) method** – the woman takes her body temperature at the same time each morning before she gets out of bed and before she eats anything. She records her temperature on a special graph. She watches for her temperature to rise slightly – 0.2°C to 0.5°C (0.4 °F to 1.°F) just after ovulation (usually midway through the menstrual cycle) vaginal sex should be avoided from the first day of monthly bleeding until 3 days after the woman's temperature has risen above her regular temperature.

- **Ovulation method (**also known as Billings Method or cervical mucus method**) –** the woman checks everyday for cervical secretions on fingers, underwear or tissue paper or by sensation in or around her vagina. When a woman sees or feels cervical secretions, she may be fertile. The secretions have a "peak day" – the last day when they are clear, slippery, stretchy and wet (she will know when this has passed when on the next day, her secretions are sticky or dry, or she has no secretions at all). She continues to consider herself fertile for three days after the peak day and avoids unprotected sex. However, ovulation might occur early in the cycle, during the last days of monthly bleeding, and heavy bleeding could make mucus difficult to observe.

- **Symptothermal method** – combines the use of BBT, cervical secretions and other fertility signs such as breast tenderness and ovulatory pain (lower abdominal pain or cramping around the time of ovulation). Unprotected sex is avoided between the first day of monthly bleeding and either the fourth day after the peak cervical secretions or the third day after the rise in temperature (BBT), whichever happens later.

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Effectiveness of the fertility awareness methods depends on the user and pregnancy rates with consistent and correct uses vary for the different types of methods.

m) Combined Patch

The combined patch is small, thin, square flexible plastic worn on the body. It continuously releases two hormones- progestin and an oestrogen, like the natural hormones progesterone and oestrogen in a woman's body-directly into the bloodstream. A new patch is worn every week for 3 weeks, then no patch for the fourth ($4^{th)}$ week. During the fourth week, the woman will have monthly bleeding. It works primarily by preventing ovulation. There is no delay in return of fertility after patch used is stopped. Side effects include skin irritation or rash where the patch is applied, headaches, nausea, vomiting, breast tenderness and pain, abdominal pain, flu symptoms, and irritation, redness or inflammation of the vagina (vaginitis). The combined patch is relatively new and not widely distributed. Research on its effectiveness is limited.

n) Combined vaginal Ring

A flexible ring placed in the vagina to continuously release the hormones, progestin and oestrogen. The ring is kept in place for 3 weeks, and then removed on the fourth week after which the woman will experience monthly bleeding. It also works by preventing ovulation and there is no delay in the return of fertility after the ring use is stopped. The most common side effects reported include headache (6.6%), leucorrhea (5.3%), and vaginitis (5.0%). The failure rate in one study was 0.65 per 100 woman-years (95% CI, 0.24–1.41) (Roumen, Apter and Mulders, 2001). It is also new and not widely distributed. Research on its effectiveness is limited. Effectiveness rates in clinical trials of the vaginal ring suggest that it may be more effective than the combined oral contraceptives, both as commonly used and with consistent and correct use.

2.5 Pattern of Contraceptive Use

In the US, the proportion of women aged 15–44 currently using a contraceptive increased from 56% in 1982 to 64% in 1995, and then declined slightly to 62% in 2002 (Mosher and Jones, 2000). In Nigeria, Use of family planning has risen slightly since 2003 when 8% of

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currently married women used a modern method of family planning. This is due to a small increase in the use of injectibles and male condoms. Use of traditional methods has remained steady (NDHS, 2008).

Use of modern family planning varies by residence and zone. Modern methods are used by 17% of married women in urban areas compared with 7% in rural areas. Overall, current use of contraception in Urban Nigeria has increased from 9.6 percent in 1990 to 16.7 percent in 2008. Modern contraceptive use ranges from 3% of married women in North West zone to 21% in South West zone. Generally, knowledge of contraceptives is higher among southern urban residents than among those living in the North. This is particularly noticeable both for men and women in 2003 and 2008 (Jean et al, 2011).

Jean et al., (2012) observed the initiation of contraception at lower parities. The trend towards initiating family planning use at lower parities can also be seen by comparing data from the four surveys from 1990, 1999, 2003 and 2008. In 1990, for example, only 11.0 percent of urban currently married women reported initiating contraceptive use when they had fewer than three children, compared with 21.2 percent in 2008. Even for currently married women at zero parity, the trend toward initiating family planning use rose from 8.4 percent in 1990 to 12.0 percent in 2008.

Over the years studies have shown there has been increasing prominence of the private sector in being the major source of modern contraceptive methods expressing the fact that the private sector is increasingly viewed as part of the continuum of care and has the potential to increase coverage of reproductive health services, especially for women who cannot or choose not to access government services (Bazant, Koeing, Fotso and Mills, 2009; World Health Organization, 2004).

Studies have speculated that almost all characteristics such as women's age, number of living children, household wealth index, women's education, religion, desire for more children, a couple's working status, being visited by a family planning worker, and the husband's view on family planning all have significant relationships with contraceptive use. These eight characteristics had a significant relationship upon modern method use also. This was supported by previous studies in other countries (Joesoef, Andrew and Budi, 1988;

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Ntozi and Kabera, 1991; Dang, 1995; Jayaraman, 1995; Mahmood and Karin, 1996; Douthwaite and Patrick, 2005; Schoemaker, 2005). In support of the above, is a study that expressed that the extent of contraception use varies according to cultural factors, age, parity, education, occupation (of wives and husbands), family attitude, motivation, availability and acceptability of contraception (Ogbeide, 1999, Orji and Onwudiegwu, 2002).

In the U.S virtually all women (98%) aged 15–44 who have ever had intercourse have used at least one contraceptive method. Overall, 62% of the 62 million women aged 15–44 are currently using one. 31% of the 62 million women do not need a method because they are infertile; are pregnant, postpartum or trying to become pregnant; have never had intercourse; or are not sexually active. Thus, only 7% of women aged 15–44 are at risk of unwanted pregnancy but are not using contraceptives. Among the 43 million fertile, sexually active women who do not want to become pregnant, 89% are practicing contraception and 64% of reproductive-age women who practice contraception use reversible methods, such as oral contraceptives or condoms. The remaining women rely on female or male sterilization. Fifteen percent (15%) of contraceptive users rely on dual methods (most often the condom combined with another method). The proportions using more than one method are greatest among teenagers and never-married women (Mosher and Jones, 2000).

A study carried out at the University of Nigeria Teaching Hospital, Enugu captured that during the five year review period (January 1993-December 1997), 19,470 clients visited the family planning clinic of the University of Nigeria Teaching Hospital, Enugu. Of these, 2402 clients (12%) were new patients and 17,068 (88%) were old patients. Among the new clients, 2262 (94%) eventually accepted a contraceptive method. The majority of the women (60%) chose the intrauterine contraceptive device (IUCD), 20% chose the injectables, while bilateral tubal ligation and norplant were chosen by 8% and 7%, respectively, of the clients. The oral contraceptive pill was the least popular (1%) (Ozumba and Ibekwe, 2001).

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2.5.1 Effect of age on contraception methods

Contraceptive choices vary markedly with age. In the United States, the pill is the leading method among women younger than 30 and by age 35, more women rely on sterilization. Condom use is especially common among teens, 20–24-year-olds, childless women and never-married women. The pill and female sterilization have been the two leading contraceptive methods overall in the United States since 1982 (Mosher and Jones, 2000). A study carried out in China also expressed similar results, sterilization was more commonly reported in the older age group but unlike the previous study the most common contraception methods used by the younger age group were intrauterine device (IUD) and condoms (He et al, 2009), this was supported by another study carried out in Jordan where the younger women preferred IUCD. The result obtained from this study showed significant differences among different age groups with different types of contraceptives (Najla, 2003).

Current use of any modern method of contraception varies with age in urban Nigeria, peaking at age group 30-39 and then declining at age 40 plus. This pattern of contraceptive use by age is typical of most countries. The drop in current use among older women is usually attributed to their declining fecundity –whether perceived or real - while lower levels of use among younger women are usually attributed to their desire to have (more) children. Contraceptive use among women aged less than 20 years increased from 3.3 percent in 1990 to 7.8 percent in 2003 and decreased to 4.0 percent in 2008 (Jean et al., 2011).

2.5.2 Effect of Education on contraception methods

In the United States, female sterilization is most commonly relied on by women who are aged 35 or older, women who are currently or have previously been married and women with less than a college education. The pill is the method most widely used by women who are in their teens and 20s, never-married women and women with at least a college degree (Mosher and Jones, 2000)

In Nigeria, modern contraceptive use increases with women's education. Knowledge is positively associated with increase in the level of education, with educated women and men being much more likely to know about modern family planning methods than those with no education. A survey in Nigeria indicated almost one-quarter (24%) of married women with

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more than secondary education use a modern method compared with 3% of women with no education (Jean et al, 2011).

This was similar to findings of studies conducted in other countries which also indicated that women's' education had a strong positive effect on their current use of contraception (Martin, 1995; Arokiasamy, 2002; Iyer, 2002; Khan and Khan, 2007). The same was noted by Jejeebhoy (1995) who argued that educated women were more likely to use contraception than uneducated women since education is expected to improve the motivation to practice birth control. Increasing the education levels of women may be one effective way of advancing the practice of family planning. This suggests that the government should encourage more young women to attain higher education levels.

2.5.3 Effect of working status and Income level on contraception methods

A couple's working status also has a significant effect on contraceptive use. Working women tended to choose more long term effective modern methods since they are more likely to have the ability to make a fertility choice. As Jayaraman argues, improving employment opportunities for women will increase the prevalence of contraception thus, hopefully, lower the birth rate (Jayaraman, 1995).

Use of modern methods also increases with household wealth. Three percent (3%) of women in the poorest households use a modern method of family planning compared with 22% of women in the wealthiest household (Jean et al, 2011). Poor and low-income women are more than twice as likely as higher income women to use the 3-month injectibles. About 7.3 million Women use barrier contraceptives, such as the male condom (Mosher and Jones, 2000).

2.5.4 Effect of parity on contraception methods

Jean et al., (2011), observed the initiation of contraception at lower parities. The trend towards initiating family planning use at lower parities can also be seen by comparing data from the four surveys from 1990, 1999, 2003 and 2008. In 1990, for example, only 11.0 percent of urban currently married women reported initiating contraceptive use when they had fewer than three children, compared with 21.2 percent in 2008. Even for currently

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married women at zero parity, the trend toward initiating family planning use rose from 8.4 percent in 1990 to 12.0 percent in 2008 (Jean et al, 2011). Studies have indicated that women who had two or more children preferred IUCD and its use decreases with the increased number of children (Najla, 2003)

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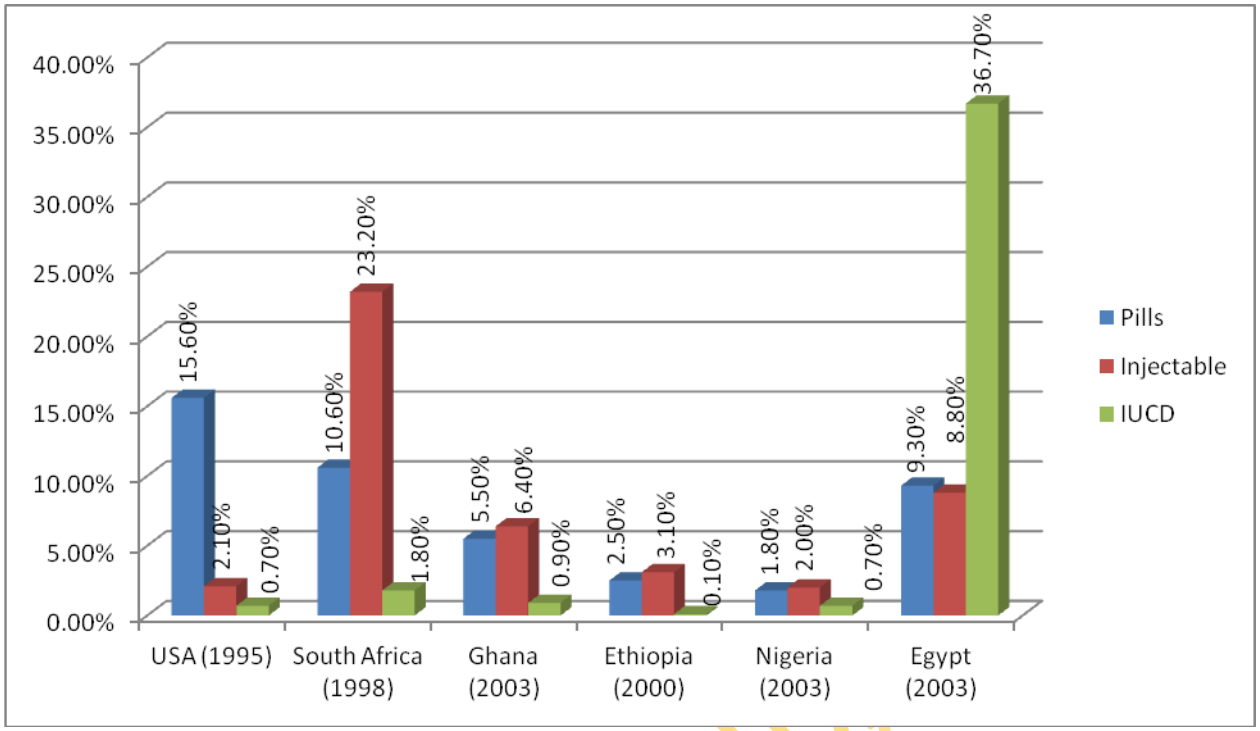

Source: United Nations Department of Economic and Social Affairs, 2008.

Fig 2.1: Prevalence of contraceptive use among women of the reproductive age from different countries.

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2.6 Nutrients

A nutrient is chemical that an organism needs to live and grow or a substance used in an organism's metabolism which must be taken in from its environment (Whitney and Sharon, 2005). Nutrients are the substances that enrich the body. They build and repair tissues, give heat and energy, and regulate body processes.

Nutrients are frequently categorized as essential or nonessential. Essential nutrients are unable to be synthesized internally (either at all, or insufficient quantities), and must be obtained from an external source. For humans, these include essential fatty acids, essential amino acids, some vitamins, and certain dietary minerals. Oxygen and water are also essential for human survival but are generally not considered "food" when consumed in isolation. Water is considered an essential nutrient because it is the solvent in which all the chemical reactions of life take place. While non- essential nutrients are nutrients that can be synthesized by an organism. Non essential substances in foods can still have a significant impact on health, whether beneficial or toxic. For example, most dietary fiber is not absorbed by human digestive tract, but is important in digestion and absorption of otherwise harmful substances (Vaughan et al., 2009). Interest has recently increased in phyto-chemicals, which include many non- essential substances which may have health benefits (Whitney et al., 2005).

Types of essentials nutrients include:

1. Macronutrient
2. Micronutrient

Macronutrient

These are nutrients needed in large quantities. The classes of chemical compounds are consumed in the largest quantities to provide bulk energy are carbohydrates, proteins, and fats (Audrey, 1994).

Micronutrient

Vitamins and mineral are called micro-nutrients because they are required in relatively small quantities. Calcium, salt (sodium and chloride), magnesium, and potassium (along

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with phosphorus and sulfur) are required in large quantities compared to other vitamins and minerals and are called macro- minerals (Audrey, 1994).

2.6.1 Nutrient Utilization

Nutrient utilization is the process in which nutrients are used by cells for building tissue, providing energy or regulating various functions. The body uses three processes to utilize nutrients: Digestion, Absorption and Metabolism (Da Poian et al., 2010).

Digestion: breaking down into smaller pieces of nutrients in the alimentary tract. It is the mechanical and chemical breakdown of food into smaller components that are more easily absorbed into the blood stream.

Absorption is the process where blood capillaries pick up the digested nutrients or the entry of the digestive end products into the bloodstream.

Metabolism: this refers to all the physical and chemical processes in the body that converts or use

Food eaten must be utilized by the body for nourishment. Nutrient utilization is influenced by:

- The Health status of an individual
- Variety of food in the diet also influences nutrient utilization.

2.6.2 Contraceptives and Nutrient Utilization

Fifty different metabolic reactions caused by the hormones in hormonal contraceptives (HCs) may impact nutritional needs and requirements. Since oral contraceptives have been predominant for more than 30 years, much more information is available on the nutritional implications of their use. The estrogen and progestogen in oral contraceptives change the body's metabolism both directly and indirectly. Indirectly, they cause the adrenal cortex to produce the stress hormone cortisol. The increase in cortisol has an effect on protein, carbohydrate, and fat metabolism. Glucose intolerance and hyperinsulinemia are caused by changes in carbohydrate metabolism associated with HCs (Dale, 2006).

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Oral contraceptives and other hormonal methods have been implicated in lowered levels of vitamins- thiamine ($B_{1)}$, riboflavin ($B_{2)}$, nicotinic acid ($B_{3)}$, and cobalamin ($B_{12)}$. A deficiency of vitamin B_1 can result in depression, irritability, memory loss, muscle weakness, and edema, while vitamin B_2 deficiency primarily affects the skin, eyes, and mucous, membranes of the gastrointestinal tract. Nicotinic acid deficiency from contraceptives may explain why twice as many women die from pellagra (lack of B_3) than men do. Symptoms include problems with the skin, gastrointestinal tract, and nervous system (Ross, 2009).

Studies have also reported that oral contraceptive use causes a significant decline in folic acid, vitamin C, magnesium and zinc levels which are all needed to maintain the immune system (Ross, 2009). Injectibles on the other hand have been reported to increase body fat (Annon, 2009). These effects arise from the nutrient imbalance that results from the use f contraceptives (Carolyn, 2005). Whitehead et al., (1973) demonstrated megaloblastic changes in cervical smears of oral contraceptive users in the absence of general folate deficiency. Cervical cytology became normal after folate supplementation for only a few weeks (Whitehead, Reyner and Linderbaum, 1973).

Another study was carried out to find out the changes in serum vitamin A carotene and cholesterol caused by the use of 3 types of contraceptives: IUD, injectable progestogen (INJ), and oral combination estrogen-progestogen (OC). It was observed that the mean serum vitamin A and carotene levels were high in all groups and as expected, the serum vitamin A level in OC users was higher than in the other groups, but unexpectedly, the serum vitamin A was lower in IUD users. Serum carotene was lower in OC users than in other groups. Serum cholesterol was lower in the IUD and INJ groups than in the control and OC groups (Wein and Ojo, 1982). The authors suggested that a more detailed study of plasma transport forms of vitamin A is needed to determine if the very high serum vitamin A levels seen in some OC users in the population are potentially harmful.

Weight Gain

The injectable contraceptives were associated with greater likelihood of weight gain and lower likelihood of weight loss as compared to the intrauterine contraceptive device. This is in keeping with some reports that have found greater likelihood of weight gain in clients

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using the injectable contraceptives as compared to other methods (Espey, Steinhart, Ogburn and Qualls, 2000; Risser, Gefter, Barrat and Risser, 1999).

It was observed in a study that the amount of weight gained was significantly associated with the method of contraception with clients using Norplant or the injectable contraceptives being more likely to gain 10% or more of their initial weight. An association between the degree of weight gain and the method of contraception has also been reported in previous studies (Risser et al., 1999).

Studies have also shown that weight changes were significantly more likely to occur with longer duration of hormonal contraceptive use probably due to a cumulative effect of the contraceptive on the system over time. However, some studies found no significant weight change even with long-term contraceptive use (Kaunitz, 1999; Laurikka-Routti, 1992; Ladipo, Otolorin and Ojengbede, 1990; Ekwempu, Fakeye, Ladipo, Okpere and Otubu 1993).

Both weight gain and weight loss may occur with hormonal contraceptives. Weight gain, weight loss, or no change in weight may occur with oral contraceptives, (Gupta, 2000; Risser et al., 1999) injectable contraceptives, (Espey et al., 2000; Taneepanichskul, Reinprayoon and Jaisamrarn, 1999) and progestogen contraceptive implants (Laurikka-Routti, 1992; Ladipo et al., 1990; Ekwempu et al., 1993). Clients using the Norplant subdermal implants in Zaria have previously been reported to gain a mean of 0.3kg after one year of use, and 1.1kg after five years, or lose a mean of 0.2kg after three years (Ekwempu et al., 1993).

Although weight changes are usually classified as minor side effects, excessive weight gain may increase the risk of cardiovascular and metabolic side effects of hormonal contraceptives (Annual reports of ABUTH 1995 and 1996). Both weight gain and weight loss are associated with poorer physical and psychological well being (Rumpel, Ingram, Harris and Madans, 1994; Hellerstedt and Story, 1998).

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Weight loss may be associated with increased incidence of minor side effects of oral contraceptives such as menstrual cramps and menstrual irregularities, nausea, and breast discomfort, which have been reported to occur more frequently in underweight women.

Metabolism of Vitamins

A study carried out amongst 18-45 year old women to determine if the use of oral contraceptive agents (OCAs) affects the metabolism of vitamins. Vitamins and mineral supplements were given to groups in each socioeconomic classification. They had a higher intake of Vitamins-A, C, thiamin, riboflavin, and folic acid. Results indicated:

- An incidence of clinical signs of malnutrition, such as dry skin, easily pluckable hair, angular lesions of the mouth, dental caries, bleeding gums, glossitis, and scaling of the skin, were significantly more frequently observed in the lower socioeconomic groups, and especially in non-supplemented groups of women taking OCAs than in others.
- OCA administration also increased plasma Vitamin-A levels but no socioeconomic effect was found.
- Plasma carotene levels were decreased by OCA therapy, but less so in the higher socioeconomic subjects.
- Plasma ascorbate was not affected by OCA use.
- Urinary excretion of thiamin and riboflavin was decreased in subjects using OCAs. Erythrocyte folate and plasma pyridoxal phosphate (PLP) were also decreased.
- Results show a definite lowering effect of OCAs on red cell folate in subjects in the upper socioeconomic levels.
- There may also be a depletion of body stores of folic acid. The lower socioeconomic group may be marginally deficient in folic acid.
- It has been suggested that women who become pregnant soon after discontinuing OCA therapy have a high chance of developing folic acid deficiency during pregnancy. Similar results were obtained with thiamin and riboflavin. (Prasad, Oberleas, Moghissi, Stryker and Lei, 1975).

A different study carried out amongst 16-to-18-year-old girls observed an association with significant differences in several nutritional status indices with the use of OC pills. Some of these differences (e.g. lower plasma β- carotene concentration and potentially undesirable

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changes in plasma lipid concentrations) may have deleterious health consequences for long-term regular users of OCs, and could benefit from being counterbalanced by dietary modifications (e.g. lower saturated fat and higher antioxidant vitamin intakes) (Christopher et al, 2002).

Nutrients affected by contraceptives:

Vitamins:

Vitamin B-6

Many studies indicate that B-6 metabolism is different in women who take oral contraceptives. These findings are based on blood analyses as well as on measurements of how much B-6 are lost from the body through urine. The current scientific consensus is that these differences do not warrant taking more vitamin B-6 than already recommended for women in various age groups. Women who take oral contraceptives have a different form of vitamin B-6 in the blood. This change also occurs during pregnancy (Thorp, 1980).

Vitamin B6 is also necessary for the conversion of tryptophan into serotonin, both important brain chemicals. Oral contraceptive-induced vitamin B6 depletion can inhibit the production of serotonin, which increases a woman's risks of becoming depressed. In one study, one third of the women taking oral contraceptives for two to five years were found to be suffering from depression. In the brain, serotonin gets converted into melatonin, which is a hormone that helps induce sleep. Therefore, the vitamin B6 depletion caused by oral contraceptives also increases a woman's risk of developing insomnia and other sleep disorders (Ross, 2009).

Folic Acid

In several cases, women taking oral contraceptives developed folic acid deficiency. However, it appears that many of these women had low intake of folic acid or problems with intestinal absorption prior to taking birth control pills. Women on birth control pills should regularly eat good sources of folic acid. Good folate nutrition is especially important for women who become pregnant shortly after they stop taking oral contraceptives. These women should check with their doctor or health department. The FDA recently approved an oral contraceptive containing folic acid.

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Health problems associated with folic acid depletion in women taking oral contraceptives include anemia, birth defects and cervical dysplasia, which is a pre-cancerous condition characterized by abnormal cells that can be detected in the cervix by pap smear and other methods. Many women with cervical dysplasia end up having a hysterectomy. Sadly, hundreds of thousands of women have hysterectomies every year and many of these surgeries could be prevented if women had adequate folic acid. Other problems associated with folic acid deficiency include depression and increased risk of breast cancer and colorectal cancer (Ross, 2009).

Riboflavin (Vitamin B-2)

If a woman has a riboflavin deficiency before she starts taking oral contraceptives, birth control pills will aggravate that condition. Riboflavin deficiency caused by low intake is more common among lower-income women of child-bearing age who may not have access to good food sources, such as milk, meat and dark green leafy vegetables. Women who take oral contraceptives should plan their riboflavin intake. Good but inexpensive sources include dried milk and enriched grains and cereal products. When riboflavin deficiency is preexistent, OCs exacerbate the condition (this effect may be race-dependent) (Thorp, 1980).

Vitamin C

Vitamin C can be measured in the blood's liquid or plasma portion, as well as in cellular components including platelets and white-blood cells or leukocytes. Decreases in vitamin C in plasma and cellular components have been reported in women who take birth control pills. These decreases are not well understood, but they may relate to changes in copper metabolism. However, no increase has been made in the Recommended Dietary Allowance (RDA) for vitamin C for women who take oral contraceptives beyond what is currently recommended for their age group. OC users generally show significantly lower leukocyte and platelet levels of ascorbic acid, and supplementation may be necessary (Thorp, 1980).

Studies have reported that oral contraceptive use causes a significant decline in vitamin C levels. In one study, women taking both high-dose and low-dose oral contraceptives were evaluated. The results revealed that these women had a decrease in serum levels of vitamin C ranging from 30 percent to 42 percent. Some of the problems associated with vitamin C

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deficiency include a weakened immune system, poor wound healing and easy bruising (Ross, 2009).

Vitamin A

A frequent finding is that blood vitamin A levels are higher in women who use birth control pills. As observed in a study a significant increase in plasma retinol concentration with OC use among 16-to-18-year-old girls was reported as supported by others in premenopausal women (Christopher et al, 2002,). On the surface, this might seem beneficial. Studies with animals, however, indicate that the amounts of vitamin A stored in the liver could be lower, even though the amounts circulating in the blood are higher. Vitamin A, in contrast to the B vitamins, increases in the plasma of women taking OCs, perhaps due to greater mobilization of the vitamin by the liver (Thorp, 1980).

Minerals affected by Contraceptives

Iron

Iron is one of the few nutrients in question where researchers have suggested a lower amount for women who take birth control pills. Some women using oral contraceptives lose less menstrual blood. Iron is needed to make hemoglobin, the red-colored substance in blood that carries oxygen. It has been argued that if less blood is lost each month, less blood needs to be manufactured. The RDA for iron for women of childbearing age is 18 mg/day. According to the Institute of Medicine, the recommendation for women taking oral contraceptives is 10.9 mg/day. However, women taking oral contraception do not need to reduce the amount of iron-rich foods they eat or avoid multivitamins that contain iron.

Zinc

Several studies have reported reduced zinc levels in blood plasma of women on birth control pills. However, the zinc levels in red blood cells are reportedly increased in oral contraceptive users. This suggests that the zinc may be redistributed in the blood of women on the pill. The meaning of these changes is not understood. At present, the RDA for zinc for users of oral contraceptives is the same as that for non-users. Zinc levels generally decreases in association with OC use (Thorp, 1980).

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Studies report that women taking oral contraceptives also have lower serum zinc levels than matched controls. Since zinc is one of the most important nutrients for proper functioning of the immune system, oral contraceptive-induced depletion of zinc may weaken the immune system in susceptible women (Ross, 2009).

Copper

Plasma copper levels often are increased considerably in women using birth control pills. A copper-carrying protein called ceruloplasmin can destroy vitamin C by a process called oxidation. It has been suggested that the increased blood copper levels caused by birth control pills may relate to the decreased blood vitamin C levels. Copper levels in serum significantly increase in association with OC use (Thorp, 1980).

It is clear from the studies that, after adjustment for potentially confounding variables, that hormonal contraceptive especially OC use is associated with significant differences in several nutritional status indices. Some of these differences (e.g. lower plasma β-carotene concentration and potentially undesirable changes in plasma lipid concentrations) may have deleterious health consequences for long-term regular users of OCs, and could benefit from being counterbalanced by dietary modifications (e.g. lower saturated fat and higher antioxidant vitamin intakes) (Christopher et al., 2002). Young and older women taking OC have a potential increased risk of developing venous thromboembolism (Ageno et al., 2006) and cardiovascular disorders (Nema, Latif and Siddiqui, 2006).

Thomson et al. (2000) found that plasma copper levels correlate to homocysteine levels, and that use of oral contraceptives highly correlates with plasma copper. It was previously reported that intake of oral contraceptives increases serum copper (Butterworth, Hatch and Macaluso, 1992) and also decreases folate concentrations (Whitehead et al, 1973) by interfering with intestinal conjugase that is required for transmembranous folate transport, consequently leading to elevated homocysteine levels.

Three B vitamins- folic acid, pyridoxine (B6) and Cobalamin (B12), are necessary to metabolize the toxic amino acid homocysteine. Elevated levels of homocysteine represent one of the most serious risks to plaque build-up in the arteries and, ultimately, heart attacks.

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All three of these B vitamins are depleted by oral contraceptives. Thus, women who take oral contraceptives for years may very well be increasing their risk of heart disease (Ross, 2009).

Women whose diets are not adequate will only aggravate or worsen nutritional problems with birth control pills like those in the developing countries. The best general advice for a woman on birth control pills is to plan a diet that regularly includes moderate amounts of a variety of foods, including good sources of the vitamins and minerals. At present, supplements of vitamins and minerals are recommended only for high-risk groups.

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Table 2.1: Sources of nutrients

Nutrient	Good sources
Vitamin B-6	Fish, poultry, meat, whole grains, potatoes, sweet potatoes, avocado and walnut.
Folic acid	Liver, dark green leafy vegetables, dried beans, tomatoes, fresh orange juice and brown rice.
Riboflavin	Milk, meat, poultry, fish, dark green leafy vegetables, organ meats, enriched grains and grains and cereals
Vitamin C	Citrus fruits and juices, pineapple, spinach and cabbage.
Vitamin A	Liver, Red pepper, sweet potatoes, carrots, Dark green leafy vegetables (e.g spinach, turnip), Fish oils, eggs, milk, Lettuce, Paw-paw, Mangoes, green peas and tomatoes.
Vitamin B12	Meat, Poultry, bananas, dates, yoghurt, nuts, potatoes and spinach.
Iron	Meat, poultry, liver, fish, whole grain and enriched cereals and cereal products, dried beans and peas, prune juice, deep green leafy vegetables.
Zinc	Sea foods, meat, nuts, whole grains breads.
Copper	Sea foods, liver, nuts, dried beans and peas, dried fruits

Colorado State University, U.S. Department of Agriculture and Colorado counties cooperating

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2.7 Nutrition Education

Nutrition education has been defined by Andrien (1994) as "that group of communication activities aimed at achieving a voluntary change in nutrition related behavior to improve the nutritional status of the population". A distinction is often made between the terms "nutrition education, nutrition communication, nutrition promotion and information, education and communication (IEC)" (Graeff, Elder and Booth, 1994). There is a great deal of overlap in actual practice. Education activities can include information processes which are generally designed to inform unilaterally, e.g. through print and broadcast (radio and TV) channels or the more traditional communication processes which use interpersonal, face-to-face channels, e.g. group discussions, home visits, training and counseling. Each channel has its own strengths and weaknesses and it would seem that strategies which combine multiple channels have the most impact on changing behavior. The question is no longer which channel is best but rather, how to use a combination of channels to teach and support nutrition behaviors.

From the past, many strategies have been used to combat and alleviate poverty and malnutrition even to date. Nutrition education has the potential to improve nutritional well being of the populace of a nation. Nutrition education has as its focus, the conduction of interpersonal methods in local communities and health centers to help address the common problems of maternal and infant malnutrition.

Most potential for nutrition education seems to lie with television, as there are high television ownership and low literacy rates. However, nutrition messages compete with

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food advertising, and the widespread use of satellite television with many channels makes positioning messages difficult. These difficulties encountered suggest that greater attention should be given to face to face strategies in health centers as seen in a study carried out in Oman (Musaiger, 1995)

2.8 Operational Definitions

Contraceptives: These are substances or devices used to prevent conception and for this study the short-term methods will be used and they include:

Oral Contraceptives (OC): These are birth control pills taken by women to prevent pregnancy. They are often referred to as 'the pill' and are taken orally. There are different brands and they come in packs of 21 or 28 pills. One pill is taken every day. The first 21 pills have a combination of synthetic estrogen and progesterone hormones while the last 7 pills of a 28-day pack have no hormones and are called spacer pills.

Injectibles Contraceptives: Injectable contraceptives are hormone therapies given by injection into a muscle in the upper arm or buttocks.

IUCD: A plastic frame inserted into a woman's uterus (womb) through the vagina and cervix by a specifically trained health care provider.

Women of reproductive age: Women ages 15 to 49 years are generally accepted as women in the reproductive age group.

Ibadan North: It is located in the main city of Ibadan, Oyo state, south western Nigeria. The local Government is heavily populated and covers a large expanse of land with an area of about 132.5sqmeters with an estimated population of 316, 612{Male = 157,936 Female=158,676} using 2006 National Population Census. The local government has 12 political wards with 6 State owned health facilities, 11 Primary Health Centers/Maternity center and 157 number of registered private health institutions (Oyo State Health Facility Directory, 2008).

Knowledge: Information in mind-general awareness or possession of information, facts, ideas, truths or principles. The indicators that would be used to assess the knowledge of the health workers include; Variables assessed knowledge includes: Knowledge on family

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planning, types of contraceptives and some side effects, knowledge on Nutrients and knowledge on the nutritional implications of contraceptive use.

Nutrition is the process of nourishing or being nourished, especially the process by which a living organism assimilates food and uses it for growth and for replacement of tissues.

CHAPTER 3

3.0 RESEARCH METHODOLOGY

3.1 Introduction

This study has a number of inter-related objectives which has been mentioned in chapter 1 above and a valuable aspect to this research work relates to objective 2: assessing the knowledge of study participants on the effects of contraceptives on nutrient bio-availability and objective 4: documenting the effect of training on knowledge of contraceptives on nutrient bio-availability.

Chapter 2 identified a gap in existing research in that there were more than enough evidences on the need for women of the reproductive age to be provided with information on the nutritional implication of hormonal contraceptive use and as such lead to an increase in knowledge.

This chapter- research method provides the details of the research strategy adopted, together with the means of collecting data for analysis, including site and sample collection and the analysis approach adopted. In addition is the implementation of the chosen research strategy and the limitations encountered.

3.2 Description of study area

This study was conducted in Ibadan city, the largest indigenous city in sub-Saharan Africa. Ibadan, the capital of Oyo State is located between longitude 70 20’ and 70 40’ East of the Greenwich meridian and between latitude 30 55’ and 40 10’ North of the equator. The city lies in the equatorial rain forest belt and has a land area of 445 – 455km2 and has a population size of 2,550, 593 (Census, 2006).

Ibadan municipality has 5 local governments. Ibadan North, which is in the main city was chosen for this study mainly because it happens to be the only Local Government Area in

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Ibadan that has health centers at the tertiary level. Ibadan North local Government is heavily populated and covers a large expanse of land with an area of about 132.5sqmeters with an estimated population of316, 612{Male = 157,936 Female=158,676} using 2006 National Population Census. The local government has 12 political wards with 6 State owned health facilities, 11 Primary Health Centers/Maternity center and 157 number of registered private health institutions (Oyo State Health Facility Directory, 2008).

3.3 Description of study population

The study population consisted of women of the reproductive age (15- 45 years) using hormonal contraceptives (oral contraceptives, injectibles and IUCDs) who were attending tertiary health care centers offering family planning services in Ibadan North LGA.

3.4 Inclusion Criteria

This study involved all consenting women of the reproductive age (15- 49 years) currently using oral contraceptives, injectibles and IUCDs attending the family planning clinic of the tertiary health centers in Ibadan North LGA.

3.5 Study Design

This study was an intervention study, with a quasi- experimental design. There were 2 study arms – the experimental and the control group. The experimental group consisted of the women attending the Adeoyo Maternity Hospital who gave their consent to be involved in the study. Adeoyo maternity hospital was purposively selected for this study. The control group consisted of women attending the University College Hospital (UCH) Orita-mefa. The experimental group received training intervention but the control did not. Both groups were subjected to a pre-test and post-test assessment on the particular day in which the study was carried at the respective hospitals.

3.6 Sampling procedure and sample size

Of the five Local Government Areas in Ibadan municipality the Ibadan North Local Government Area was used for this study because it has health centers at the tertiary level. These health centers include: Adeoyo Teaching Maternity Hospital and the University College Hospital (UCH) Orita-mefa.

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For the pilot study a total population of three hundred consenting women present at the family planning clinic during the study were approached and interviewed.

Pretest of questionnaire was done at Jericho Nursing Home, Ibadan North West.

Via purposive sampling, Adeoyo Teaching Maternity Hospital was used for the survey and also for the selection of the experimental group which was purposively selected subset of 30 women out of which only 23 consented. Another 30 women were purposively selected from the University Teaching Hospital (UCH) Orita-mefa to serve as control.

Sample size formula for descriptive study was used to calculate the sample size

$n=z^2pq/d^2$ (Araoye, 2004)

Where,

n = minimum sample size

Z = critical value at 95% confidence interval [A standard normal deviate usually set at 1.96 or more]

P = prevalence of contraceptive use in urban areas of Nigeria [NDHS 2008]

d= level of precision taken as 0.05(i.e. 5%)

q= 1-P

p= 0.21

q= 1-0.21

= 0.79

Therefore $n= (1.96)^2*(0.21)*(0.79)/ (0.05)^2 = 254$

3.7 Recruitment of Trainees and control participants

For the experimental group a purposively selected subset of 30 women served as trainees where only 23 consented. Another 30 women were purposively selected from the University Teaching Hospital (UCH) Orita-mefa to serve as control. They were all informed that participation was free and they could decide to withdraw at anytime.

3.8 Methods and Instrument for Data Collection

This study employed a quantitative method of data collection and data was collected was over a period of 2 months by the researcher and research assistants. Four research assistants

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were employed and trained for this research and all were learned. An interviewer administered semi-structured questionnaire was used. The questionnaire was both open and close ended and was confidential to encourage truthful responses from the respondents. The questionnaire was thoroughly explained to the respondents so as to get an informed consent. The questionnaire drafted in English was translated to Yoruba language in order to adapt it to the needs of the non literate respondent, thereafter, it was translated back to ensure the meanings of the questions were retained. The interview was conducted during the family planning sessions. The questionnaire was divided into sections based on the objectives of the study as shown below:

Section A: Socio-demographic characteristic information about the respondents.

Section B: This section contained information on the pattern and types of contraceptive used by study participants and the duration of use.

Section C: Information was sought from the respondents on knowledge of the effects of contraceptives on nutrient bio-availability. The knowledge section comprised of 7 knowledge questions, 3 questions to assess the knowledge of study participants on family planning, 2 questions to assess the knowledge of study participants on nutrients and 2 questions to assess their knowledge on nutrient metabolism. (See appendix III and IV for questionnaire and knowledge scale respectively).

Section D: Perception about contraceptive use and solutions to the effects of contraceptives on nutrient metabolism.

Section D: The effect of training on knowledge of contraceptives on nutrient metabolism.

3.9 Reliability of instrument

The questionnaire was pre-tested for reliability at the Jericho Nursing Home Jericho, Ibadan North West, on eleven women who were visiting for family planning. The responses were coded, entered and analyzed with SPSS software. The reliability of the questionnaire was assessed with the Cronbach's alpha statistic. A coefficient of 0.8 was obtained which indicated that the instrument was reliable. Outcome of the pretest was used to correct and modify questions on parity which was misunderstood by some participants.

3.10 Training

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Pre-test questionnaires were developed and the result was used to formulate the training goal and training objectives (See appendix V). The training took place on the 5th of July 2010 at the Adeoyo Maternity Hospital, Ibadan North. The participants were registered on arrival and the opening ceremony commenced at 9:30am after an opening prayer by one of the participants. The training had two sessions and each session lasted for 45 minutes and each session was followed with energizers such as activities, exercises and songs. The timetable developed for the training intervention is shown in appendix VI. The content of the curriculum included the following: Knowledge on contraceptives and its side effect, knowledge on nutrients and the knowledge of contraceptives on nutrients utilization.

At the end of the training, a revision of the topics covered during the training programme was done. This was followed by the post- test of the training programme. In the experimental group, only 27 out of the 30 study participant's who registered their interest turned up for the training and 4 of these 27 made their desire to withdraw from the study while the training was being conducted leaving only 23 participants.

3.11 Evaluation

Two forms of evaluation were to be conducted: the outcome evaluation and the impact evaluation. The impact evaluation was not done because most of the study participants were lost to follow up.

3.12 The outcome Evaluation

This measured the immediate outcome or effects of the training programme as measured by the immediate effects on the experimental and control participant's knowledge. Pre-test and post-test questionnaires were administered to the experimental group before and after the training programme but for the control group, training was not conducted. This was done to find out the change in knowledge of the subjects of both groups as reflected by scores obtained on post tests. The data generated at the pre-test and post-test were subjected to the following analysis:

- Pre-test comparison of the experimental and control's mean knowledge score
- Post- test comparison of the experimental and controls' mean knowledge score

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- Pre-test and post-test comparison of the experimental groups' mean knowledge score
- Pre-test and post-test comparison of the control groups' mean knowledge score
- Gain in scores was calculated by the following formula:

Gain in scores = Post test score – pre-test score

3.13 Data Analysis

The data (quantitative) collected were codified, cleaned, coded and entered into the computer using the Statistical Package for Social Science (SPSS) version 15. Frequencies were run based on socio-demographic characteristics, contraceptive use and knowledge of family planning, nutrients and the nutritional effects of contraceptives. Open ended questions in the questionnaire were coded accordingly.

3.14 Data Management

Questionnaires were inspected daily to detect and correct errors, also to ensure they were properly filled. Data was manually sorted out, coded before entry and cleaned following entry into the computer and analyzed using the SPSS version 16. The ages of the respondents were recoded to 3 age groups that is, 15-24, 25-34, and 35-44.

The occupational groups of the respondents were assessed using the Modified British Registrar General Social Classification (2000). Professionals included managerial, teaching and other professional occupations; intermediate occupations included civil service occupations; skilled non-manual was made up of hairdressing, tailoring etc; skilled manual referred to carpentry, welders, etc; unskilled included market porters, farmers, unemployed included students and those who are still searching for job.

Knowledge questions on contraceptives, nutrients and nutritional effects of contraceptives were scored 5 for correct responses and 0 for incorrect responses. Maximum obtainable knowledge score for contraceptives, nutrients and nutritional effects of contraceptives were 18, 25 and 25 respectively. Scores below 9, 13 and 13 were classified as poor knowledge

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and scores above these values were classified as good knowledge, respectively (See appendix IV for the knowledge scale).

3.15 Ethical Considerations

Ethical approval to conduct the study was obtained from the Ethics Review Committee University of Ibadan. Permission to conduct the study was obtained from those in charge of the selected health centers.

Confidentiality of Data

Confidentiality was ensured and observed throughout and after the study. They were assured that their responses will be kept confidential

Beneficence to Participants:

This study would be beneficial to the study participants as it shed more light on the importance of counseling before the choice of the contraception and reinforced the need to find out which contraception best suits them and why. Furthermore it buttressed the side effects of contraceptives and brought to the attention of the participants the nutritional implications of contraceptives and the importance of feeding adequately and nutrition counseling while on contraceptives.

Non-Maleficience:

The research in no way inflicted harm on the participants and all participants were treated equally as much as possible.

Informed Consent

Informed consent was obtained from all the selected women who voluntarily agreed to participate in the study. It was obtained after the purpose of the study was explained to them in a language they all understood. Also sufficient information about risks and benefits were given to the participants.

Rights to Decline/withdraw from study:

Participant who wished to withdraw were free to do so without any repercussions.

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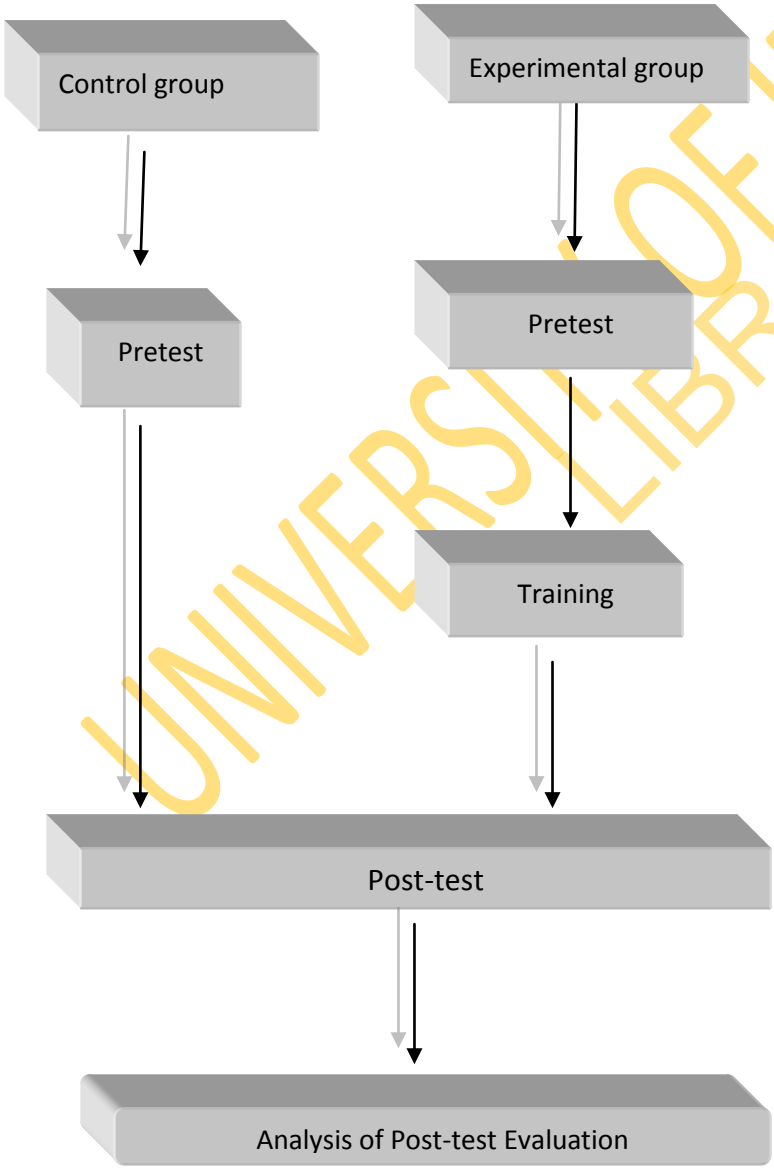
3.16 Limitations of the study

1. Due to financial constraints the training was for one (1) day.
2. The study only considered tertiary health facilities and therefore not generalizable to secondary and primary health facilities.
3. Due to loss to follow up, the impact evaluation of the training meant to be carried out during this study could not be carried out. Therefore the impact of the training could not be measured**.**



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Adapted from the Outcome of Training on Teachers' Knowledge, Perception and Self Efficacy for Prevention of Childhood Lead Poisoning in Ido Local Government Area, Oyo State Nigeria. (unpublished). Karunwi A. Oluwaseyi (2009)

Fig 3.1: Flow schedule for the study design

CHAPTER FOUR

4.0 RESULTS

This chapter presents the results of the quasi-experimental study described in chapter 3. The research concentrated on women of the reproductive age (15- 45 years) currently using oral contraceptives, injectibles and IUCDs attending the family planning clinic of the tertiary health centers in Ibadan North LGA. The researcher presented and interpreted the data which were collected from respondents in the field. The data were analyzed and presented through simple tables, pie charts and bar charts.

The results were presented in the following sections:

Section A: Socio-demographic characteristics

Section B: The baseline result showing the pattern of contraceptive use among study participants and knowledge of study participants on the effects of contraception on their nutrient utilization.

Section C: The effect of training on knowledge of contraceptives on nutrient utilization.

Section D: Respondent's view on the need for nutrition counselling and education at family clinics.

The first 2 sections revealed the result of the preliminary study. Data obtained was used to identify knowledge gap and thus a one day training intervention designed and the third section of the result revealed the result of the training intervention.

SECTION A

4.1 Sociodemographic Characteristics of Respondents

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The socio-demographic characteristics of the respondents are described in table 4.1. A total of 300 women of reproductive age were recruited into the study. The largest proportion of women (64.0%) was between the ages 25-34year with a mean age of 31.9 ± 5.1. Majority of the respondents 160 (53.3%) had completed secondary education, are Muslims 183(61.0%) and of the Yoruba ethnicity 286 (95.3%). Two hundred and ninety four 294 (98.0%) of the respondents were currently employed and 299 (99.7%) of the respondents' husbands were employed. Of the 300 women, 293 (97.7%) were married and more than half of the sample had between 1 and 3 children and 37.3% had over 4 children. Most were self employed.

Table 4.1: Socio-demographic characteristics of respondents N=300

Characteristics	Number (n)	Percentage (%)
Age group (in years)		
15-24	12	4.0
25-34	192	64.0
35-44	96	32.0
Marital Status		
Single	3	1.0
Married	293	97.7
Cohabiting	2	0.7
Divorced	2	0.7
Religion		
Christianity	117	39.0
Islam	183	61.0
Educational Qualification		
No formal education	7	2.3
Primary	78	26.0
Secondary	160	53.3
Tertiary Education	55	18.3
Respondents' occupation		
Unskilled (Trading)	207	69.0
Skilled manual (Welders)	18	6.0

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Skilled non-manual (Hair dressing)	46	15.3
Professional (Teaching)	15	5.0
Unemployed (Students)	7	2.3
Intermediate occupations (Civil servants)	6	2.0
Clergy	1	0.3
Husbands' Occupation		
Professional	31	10.3
Skilled manual	98	32.7
Skilled non manual	7	2.3
Unemployed	1	.3
Unskilled	130	43.3
Intermediate occupations	20	6.7
Clergy	13	4.3
Ethnicity		
Yoruba	286	95.3
*Others	14	4.7

*Others include: Hausa, Igbo, Wala, Ebira and a SerriaLeaonian

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SECTION B

The Baseline Results Showing:

Pattern of Contraceptive Use among Study Participants and Knowledge of Study participants on the Effects of Contraception on their Nutrient utilization

4.2.0 Pattern of Contraceptive Use among Women of the Reproductive Age

Table 4.2 adduces majority of the respondents 296 (98.7%), approved the use of family planning for spacing children and most of the respondent's spouse 252 (84.0%) approved the use of contraceptives.

Regarding who makes the decision on the use of family planning in the home of the respondents results indicated a majority 186(62.0%) specified joint decision with their spouses, 80(26.7%) stipulated self decision and 34 (11.3%) indicated their husbands/partners made the decision of using or not using family planning.

The prevalence of contraceptive use from the result shows 103(34.3%) of respondents use injectibles, 101(33.7%) use IUCD and 96 (32.0%) use oral contraceptives. Most of the women 120 (40.0%) have used their method of contraceptive for 1- 3 years, 97(32.7%) of the respondents began using contraceptives after the birth of the second child, while 71(23.7%) began after the first child.

Awareness of contraceptive methods

Majority of respondents (96%) had heard of at least one method of contraception. Among the modern methods, IUCD 229 (76.3%), injectibles 228 (76.0%), pills 201 (67.0%) were

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mentioned by over half of the respondents. Female sterilization was mentioned by less than half 22 (7.3%) of the respondents. Condom 82 (27.3%) was also mentioned. Health workers in the hospital 191 (63.7%) and the media 72 (24.1%) were the major common sources of information about contraceptives and the hospital 184(61.3%) was the most frequently mentioned place where one could obtain contraceptives from. Others mentioned sources were Pharmacies 101(33.7%) and NGO's 15 (5.0%).

Reasons for using contraception

Table 4.3 shows considerations in the choice of contraceptive method. These considerations were safety 125(41.7%), followed by its being recommended 95(31.7), the effectiveness 44(14.7%) of the method, awareness of someone using it 21 (7.0%) and the cost 3(1.0%) as shown in table 4.3. About 145 (48.3%) women used contraceptives for spacing between births, 53(17.7%) to prevent unwanted pregnancy and 7 (2.3%) to rest from child bearing.

Perception about contraception

Majority, 193 (64.3%) were satisfied with their current method and for those 107 (35.7%) not satisfied with their current method, reasons given were majorly of side effects 95(88.8%) as shown in table 5. Of the 95, the side effects mentioned was bleeding 40 (42.1%), irregularity of menstrual flow 17 (17.9%) and abdominal pain 13 (13.7%). Another 11(11.6%) were of the idea that the use of contraceptives causes headache, delay in pregnancy 9 (9.4%) and surprisingly loss of weight 5 (5.3%).

Of the respondents, 103(34.3%) stated they would prefer the use of another method. Respondents would prefer the contraceptive recommended by their doctor 23 (22.3%). But if no one recommend they would go for injectibles 20 (19.4%), IUCD 17 (16.5%), oral contraceptives 8 (1.9%), female sterilization 8 (1.9%), condom 7 (6.8%), jelly 3 (2.9) and the rhythm 2 (1.9%) method. A certain number 15 (14.6%) of the participants were unsure about which contraceptive they preferred.

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Table 4.2: Pattern of contraceptive use among respondents N=300

Variables	Number (n)	Percentage (%)
Perception of respondents on contraceptive use		
Approves use of contraceptives	296	98.7
Unsure	4	13
Perception of respondents spouse on contraceptive use	252	84.0
Approves	27	9.0
Disapproves	21	7.0
Don't know		
Who decides		
Husband	34	11.3
Wife	80	26.7
Together	186	62.0
Contraceptive methods used by participants		
Oral contraceptives	96	32.0
Injectibles	103	34.3
IUCD	101	33.7
Distribution of awareness of contraceptive methods		
IUCD		

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Injectibles	229	76.3
Pills	228	76.0
Condom	201	67.0
Sterilization	82	27.3
Implant	22	7.3
*Others	16	5.3
	16	5.3
Duration of use (Years)		
<1	82	27.3
1-3	120	40.0
4-6	71	20.3
7-9	21	7.0
>9	16	5.3
Respondents first time of using contraceptives		
Before the birth of the first child	32	10.7
After the birth of the first child	71	23.7
After the birth of the second child	97	32.7
After the birth of the 3rd child	52	17.0
After the birth of the 4th child	39	13.0
Cant recall	10	3.3
Source of contraceptives		
Hospitals	184	61.3
Pharmacy	101	33.7
NGOs	15	5.0
Sources of Information on contraceptives		
Health Workers	191	63.7
Media	72	24.1

***Others-** Rhythm, Diaphragm and Traditional methods.

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Table 4.3: Respondents response on choice of contraceptives N=300

Response on choice of contraceptives	Number (no)	Percentage (%)
Reasons for choice		
Cost	3	1.0
Effectiveness	44	14.7
Safety	125	41.7
Recommended	95	31.7
Knows someone who uses it	21	7.0
*Others	12	3.9
Reason for use		
Birth spacing	145	48.3
Preventing unwanted pregnancy	53	17.7
Resting from child bearing	7	2.3
Complaints regarding method used		
No	193	64.3
Yes	107	35.7
Problem with current method	189	63.0
No	4	1.3
Don't Know	107	35.7
Yes		

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Types of problems with method (N=107)		
Side effect	95	88.8
Access& accessibility	1	0.9
Not convenient	9	8.4
Less effective	4	1.9
Types of side effects (N=95)		
Bleeding	40	42.1
Irregularity of menstrual flow	17	17.9
Loss of weight	5	5.3
Delay	9	9.4
Abdominal pain	13	13.7
Headache	11	11.6
Respondents who would prefer the use of another method		
No	179	59.7
Don't Know	18	6.0
Yes	103	34.3
Percentage distribution of methods preferred by the respondents (N=103)		
IUCD	17	16.5
Oral contraceptives	8	7.8
Injectibles	20	19.4
The recommended method	23	22.3
+Others	35	34.0
Number of participants who have received nutrition counseling		
No	255	85.0
Yes	45	15.0

***Others**- Medical reasons& Husbands advice
+**Others**- Condom, Jelly, Female sterilization, Rhythm method and those uncertain

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4.2.1 The Knowledge of Women on the Nutritional Effects of Hormonal Contraceptives

The knowledge aspect comprised of three components: knowledge on family planning, nutrients and effects of contraceptives on nutrients.

Respondents' knowledge of family planning:

Shown in table 4.2 is the knowledge of respondents regarding family planning, results showed that all respondents had heard of family planning but only 272 (90.7%) could say what family planning was. Health workers in the hospital 191 (63.7%) and the media 72 (24.1%) were the most common sources of information about contraceptives and the hospital 184(61.3%) was the most frequently mentioned place where one could obtain contraceptives from. Respondents knowledge on side effects showed weight gain 276 (92.0%), irregular menses 122 (40.7%) and delay in pregnancy 43 (14.3%) as the majorly known side effects. This is shown in table 4.5.

Respondents' knowledge on types of Nutrients

Respondents seem to be oblivious of the nutrients they get from the food they eat. Protein 66 (22.0%) and carbohydrate 65 (21.7%) were the most known nutrients and majority could say where these two nutrients can be gotten from but less than half of the respondents could say fruits are sources of vitamins. This is seen in table 4.6.

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Table 4.4: Percentage distribution on the knowledge on the side effects of contraceptives

Side effects	Frequency (n)	Percentage (%)
Weight gain	276	92.0%
Headache	28	9.3
Delay in pregnancy	43	14.3
Irregular Menses	122	40.7
Nausea	3	1.0
Barrenness	17	5.7
Loss of memory	2	0.7
Abdominal pain	10	3.3
IUCD can fall out	23	7.7

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Table 4.5: Respondents' knowledge of Nutrients:

Nutrients	Number(No)	Percentage (%)
Carbohydrate	65	21.7
Protein	66	22.0
Fat	50	16.7
Vitamin	43	14.3
Minerals	21	7.0
Unsure	55	18.3

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Respondents' socio-demographic characteristics and knowledge of nutrients

Table 4.8, shows mean nutrients knowledge score of the participants. There was no significant difference in the mean knowledge score of age groups 15-24 (34.2±16.8), 25-34 (39.5±16.5) and 35-45 (40.7±20.1) (F= 0.75, p= 0.48). The mean knowledge score ranged from 25.7±17.7 to 48.1±21.9 among those who had no formal education and tertiary education respectively with a significant difference (F= 6.75, p= 0.00). Marital status; the single (43.33±23.63), cohabiting (17.50±10.61), divorced (45.00±21.21) and the married (39.71±17.68) did not significantly affect the mean knowledge score of nutrients (F = 1.14, p = 0.33). Mean knowledge score for education ranged from intermediate occupations (48.33±21.83) to unskilled (39.13±16.24) with a significant difference (F=2.14, p=0.05). However, the mean knowledge score of nutrients by religion was 40.81±18.14 and 38.88±17.48 respectively with no statistical significant (F = 0.85, p = 0.36). Also there was no significant difference observed in the mean knowledge score of nutrient score for the method of contraception used (F=1.15, p=0.32)

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Table 4.6: Respondents' socio-demographic characteristics and mean nutrients knowledge score of nutrient utilization

Socio-demographic characteristics	N	Mean±S.d	Anova	p-value
Age group (in years)				
15-24	12	34.2±16.8	0.75	0.48
25-34	192	39.5±16.5		
35-4	96	40.7±20.1		
Marital Status				
Single	3	43.33±23.63	1.143	0.333
Married	293	17.68±1.03		
Cohabiting	2	17.50±10.61		
Divorced	2	45.00±21.21		
Religion				
Christianity	117	40.81±18.14	0.85	0.36
Islam	183	38.88±17.48		
Educational Qualification				
No formal education	7	25.71±17.66	6.746	.000
Primary	78	36.92±16.42		
Secondary	160	38.66±15.72		
Tertiary Education	55	48.09±21.97		
Respondents' occupation				
Unskilled (Trading)	207	39.13±16.24	2.14	0.05
Skilled manual (Welders)	18	35.83±15.93		
Skilled non-manual (Hair dressing)	46	38.70±18.21		
Professional (Teaching)	15	53.33±28.45		
Unemployed (Students)	7	35.71±21.69		
Intermediate occupations (Civil servants)	6	46.33±21.83		
Clergy	1	25.00		

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Method of contraceptives				
Oral contraceptive	96	37.45±16.19	1.15	0.32
Injectibles	103	40.19±17.54		
IUCD	101	41.14±19.23		

Knowledge on Nutrient Metabolism

Only 28 (9.3%) of the 300 respondents' could say what nutrient metabolism was, 18 of which had secondary education. Only 13 (4.3%) respondents knew nutrients were affected by contraceptives and the major source of information was participants' friends 15(5.0%). None of the women could mention the nutrients affected by contraceptives.

Respondents' socio-demographic characteristics and knowledge of the effects of Hormonal contraception on nutrients

Table 4.9, shows mean nutrient metabolism knowledge score of the participants. There was no significant difference in the mean knowledge score of age groups 15-24 (1.67±2.46), 25-34 (1.67±2.58) and 35-45 (1.46±2.28) (F= 0.23, p= 0.795). The mean knowledge score ranged from 1.43±2.44 to 1.91±2.50 among those who had no formal education and tertiary education respectively with no significant difference (F= 0.45, p= 0.719). Marital status; the single (1.67±2.89), cohabiting (5.00±0.00), divorced (2.60±3.54) and the married (1.57±2.47) did not significantly affect the mean knowledge score of nutrients (F = 1.72, p = 0.184). Mean knowledge score for education ranged from intermediate occupations (3.57±2.44) to unskilled (1.52±2.46) with no significant difference (F=1.43±02.02). However, the mean knowledge score of nutrients of respondents by religion was 1.45±2.44 and 1.84±2.42 respectively with no statistical significant (F = 1.72, p = 0.184). Also there was a significant difference observed in the mean knowledge score of nutrient score for the method of contraception used. Oral contraceptives (2.14±2.79), Injectibles (1.55±2.43) and IUCD (1.14±2.11) (F=4.10, p=0.02)

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Table 4.7: Respondents' socio-demographic characteristics and knowledge of nutrient utilization

Socio-demographic characteristics	n	Mean±S.d	Anova	p-value
Age group (in years)				
15-24	12	1.67±2.46	0.23	0.795
25-34	192	1.67±2.58		
35-4	96	1.46±2.28		
Marital Status				
Single	3	1.67±2.89	1.37	0.253
Married	293	1.57±2.47		
Cohabiting	2	5.00±.000		
Divorced	2	2.60±3.54		
Religion				
Christianity	117	1.84±2.42	1.72	0.184
Islam	183	1.45±2.50		
Educational Qualification				
No formal education	7	1.43±2.44	0.45	0.719
Primary	78	1.41±2.27		
Secondary	160	1.59±2.60		
Tertiary Education	55	1.91±2.50		
Respondents' occupation				
Unskilled (Trading)	207	1.52±2.46	1.43	0.202
Skilled manual (Welders)	18	1.67±2.43		
Skilled non-manual (Hair dressing)	46	1.30±2.46		
Professional (Teaching)	15	2.67±2.58		
Unemployed (Students)	7	3.57±2.44		
Intermediate occupations (Civil servants)	6	1.67±2.58		
Clergy	1	0.00		
Method of contraceptives				

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Oral contraceptive	96	2.14±2.79	4.10	0.017
Injectibles	103	1.55±2.43		
IUCD	101	1.14±2.11		

4.2.2 Perceived Solutions to the Effects of Contraceptives on Nutrient Utilization

Perceptions of women regarding the solutions to the effects of contraceptives on their nutritional status, 164(54.7%) had no idea on how the situation can be handled, 104(34.7%) suggested a consultation with a doctor, 13(4.3%) suggested a change of method and the need to feed well and 3(1.0%) suggested the need for workshops to enlighten women on how to handle such situations when they arise. This can be seen in table 4.10 below.

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Table 4.8: Perceived solutions to the effects of contraceptives on nutrient utilization n=300

Solutions proffered	Number (no)	Percentage (%)
Eat well	13	4.3
Workshops	3	1.0
Don't know	164	54.7
Consult the doctor	104	34.7
Counseling	3	1.0
Change the method	13	4.3

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SECTION C

4.3 The Effect of Training on Knowledge of the Nutritional Implications of Contraceptives

The socio-demographic characteristics of the participants are presented in table 4.11. The mean age of the experimental group was 32.83±6.2 and that of the control was 31.67±4.5. More of the participants, both in experimental (56.5%) and control (73.3%) were within the 25-34 years age bracket. Among the control no one was within the age group of 15-24, the experimental group had only 2 (8.7%) participants in this age group. All participants were married. In the experimental group 13 (56.5%) and 2 (8.7%) had secondary and tertiary education, respectively while a higher percentage of the control 19 (63.3%) and 7 (23.3%) had both, respectively. Results showed that 11(47.8%) used IUCD, 10 (43.5%) used injectibles and 2 (8.7%) used oral contraceptive pills. While among the control, 11 (36.7%) used oral contraceptive pills, 11(36.7%) used injectibles and 8(26.7%) used IUCD. The details of the socio-demographic information of the participants are contained in table 4.11.

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Table 4.9- Socio-demographic characteristics of experimental and control groups at pre-training

Characteristics	Experimental (N=23)		Control (N=30)	
Age group (in years)	**No**	**%**	**No**	**%**
15-24	2	8.7	0	0
25-34	13	56.5	22	73.3
35-44	18	34.8	8	26.7
Marital Status				
Single	0	0	0	0
Married	23	100	23	100
Religion				
Christianity	9	39.1	11	36.7
Islam	14	60.9	19	63.3
Educational Qualification				
No formal education	1	4.3	0	0
Primary	7	30.4	4	13.3
Secondary	13	56.5	19	63.3
Tertiary Education	2	8.7	7	23.3
Method of contraceptive used				
Oral contraceptives	2	8.7	11	36.7
Injectibles	10	43.5	11	36.7
IUCD	11	47.8	8	26.7

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4.3.1 Participants Knowledge on family planning at pre-training: types of contraceptives and the side effects of contraceptives at pre-training

Majority in the experimental group (91.3%) and the control group exactly 100.0% had heard about family planning (fig 4.1) at pre-training and considered it an important health action. The main reasons given by respondents from the experimental group for using family planning were to prevent unwanted pregnancy (56.5%), birth control (21.7%), Spacing children (8.7%) and resting from Child birth (4.3%) while the control groups' reasons for using family planning include: spacing of children (60.0%), prevention of unwanted pregnancy (26.7%) and birth control (13.3%) as shown in fig 4.2. Participants sources of information about family planning in both experimental and control groups are presented in figure 4.5. The hospital constituted the major source of information for the experimental group (65.2) and the control group (63.3%). Other mentioned sources of information about family planning were Radio (experimental- 17.4%; control- 16.7%) and Television (experimental- 17.4%; control- 10.0%). 10.0% of the control group also mentioned NGO's as a source of information on family planning.

Table 4.12 shows participants general knowledge regarding family planning. The table indicates that majority (91.3%) of the participants in the experimental group and 100% in the control group could say what family planning was. Types of contraceptives and their side effects at pre-training are shown in table 4.13 and table 4.14.

At pre-test as shown in table 4.13 regarding participants' knowledge on family planning methods indicate that 11 of the participants (47.8%) in the experimental group had heard of IUCD as a method of family planning and 53.3% in the control group. Only 21.7% of the experimental group and 53.3% in the control group had heard of condom, 10 (43.5%) participants in the experimental group and 24 (80.0%) in the control group had heard of oral contraceptives while 65.2 % in the experimental group and 56.7% in the control group had heard of injectibles. The other details are presented in that same table.

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High lighted in table 4.14 is participants' knowledge on the side effects of contraceptives. For the experimental group 43.5% could say at least 1 side effect of contraceptives and 76.7% in the control group could do the same. Majority 30.4% in the experimental group mentioned menstrual irregularities as a side effect while in the control group 56.7% mentioned weight again as a side effect.

4.3.2 Participants Knowledge on family planning at post-training

Exactly 100.0% in the experimental group and the control group had heard about family planning at post-training (fig 4.2) and considered it an important health action. The main reasons given by respondents from the experimental group for using family planning were to prevent unwanted pregnancy (56.5%), birth control (13.0%), and spacing children (30.4%) while the control groups' reasons for using family planning include: spacing of children (60.0%), prevention of unwanted pregnancy (26.7%) and birth control (13.3%). This can be seen in fig 4.3.

Table 4.12 shows participants general knowledge regarding family planning. The table indicates that both the experimental and control group could say what family planning was. The two other aspects on the knowledge of family planning; types of contraceptives and their side effects at pre-training are shown in table 4.13 and table 4.14.

Post training result as shown in table 4.13 and 4.14 about participants' knowledge on family planning methods and their side effects indicate that participants in the control group were more knowledgeable on various contraceptives methods than participants in the experimental group. In general despite the fact that participants in both groups had heard of family planning and knew what it meant, the overall result shows that participants in the control group (9.53±3.3) were more knowledgeable about family planning than participants in the experimental group (8.52±2.2).

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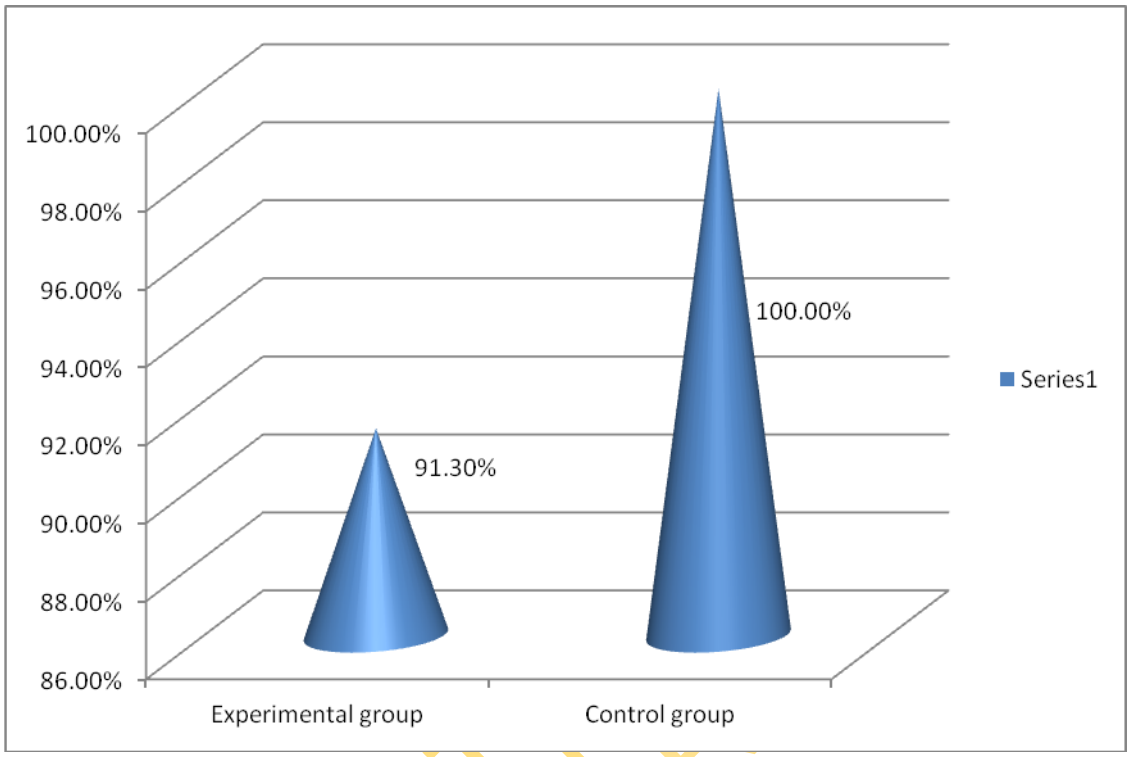

Fig 4.1- Level of awareness of family planning among the experimental and the control groups at pre-training.

Experimental group (N=23)
Control group (N=30)

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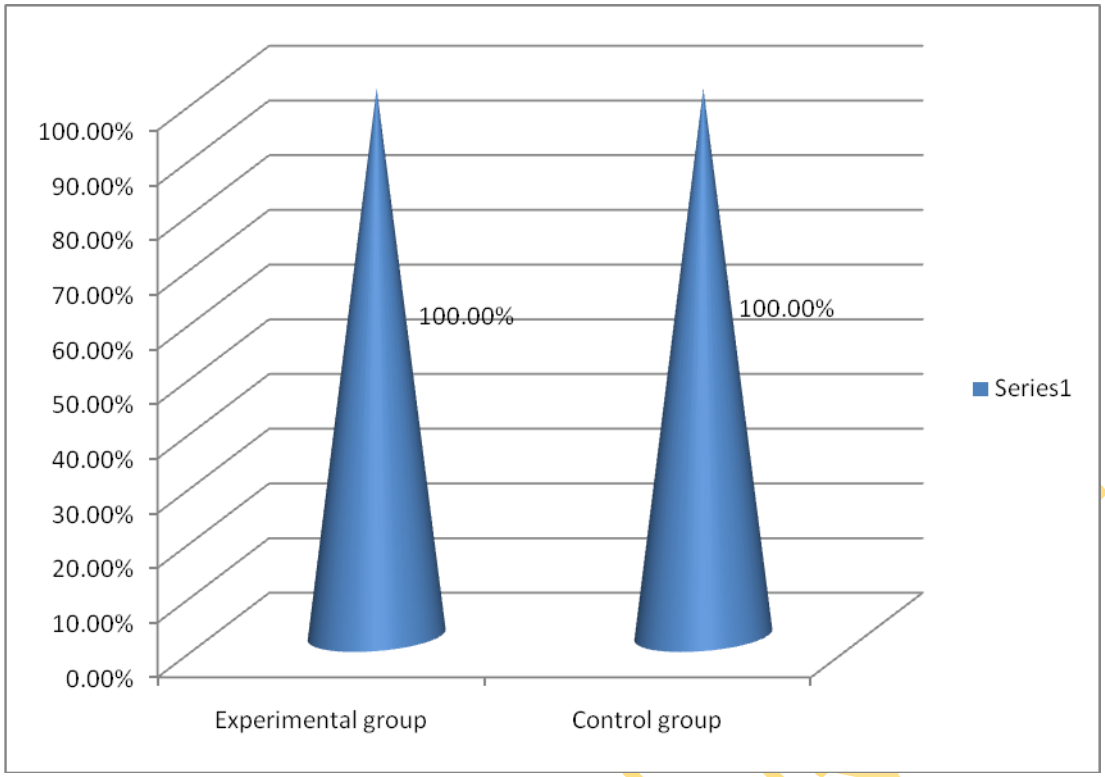

Fig 4.2- Level of awareness about family planning among the experimental and the control groups at post-training.

Experimental group (N=23)
Control group (N=30)

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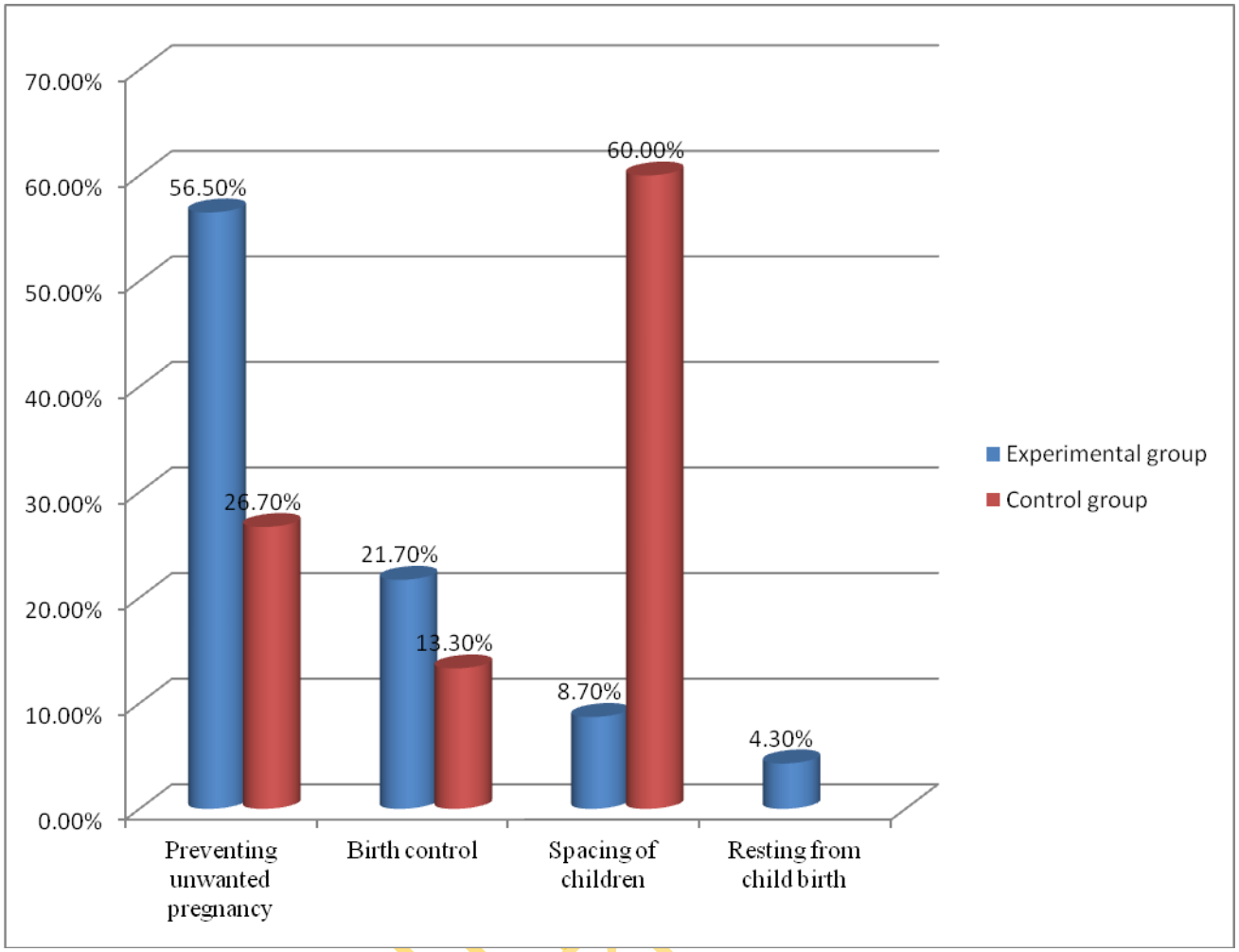

Fig 4.3: Reasons given by the experimental and control group for using family planning pre-training

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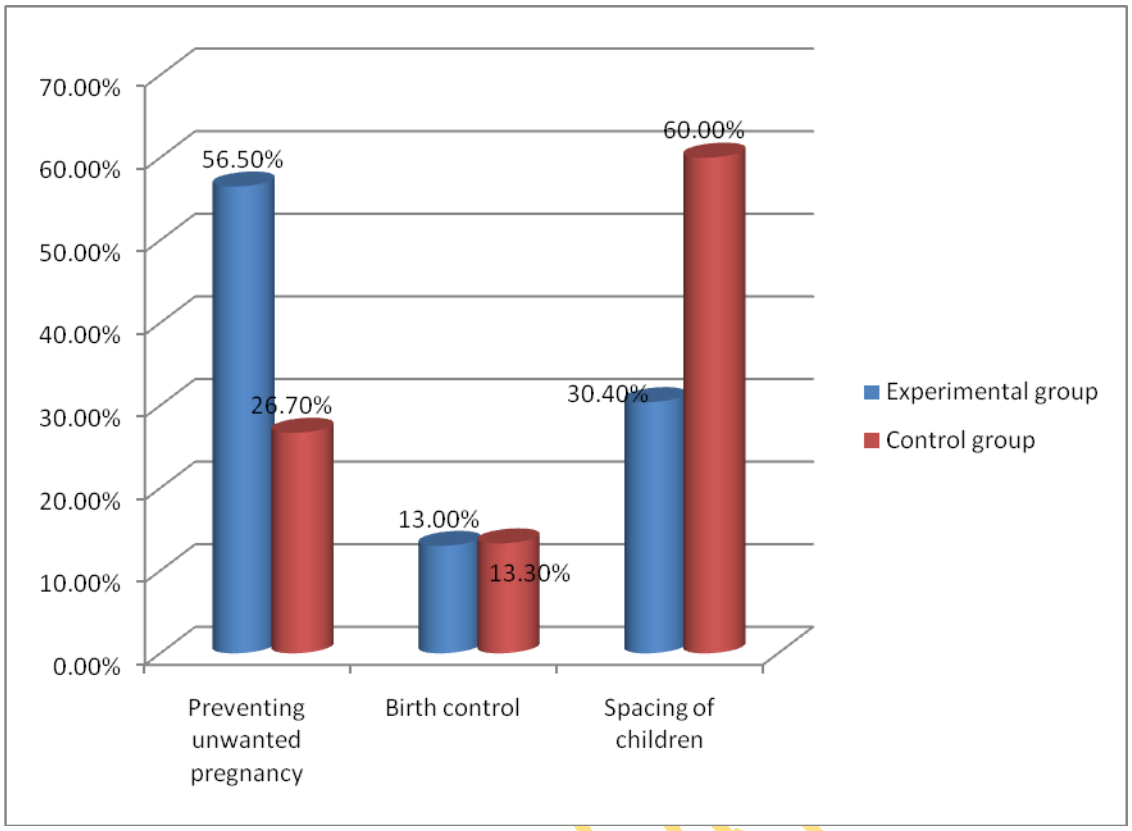

Fig 4.4: Reasons given by the experimental and control group for using family planning at post-training

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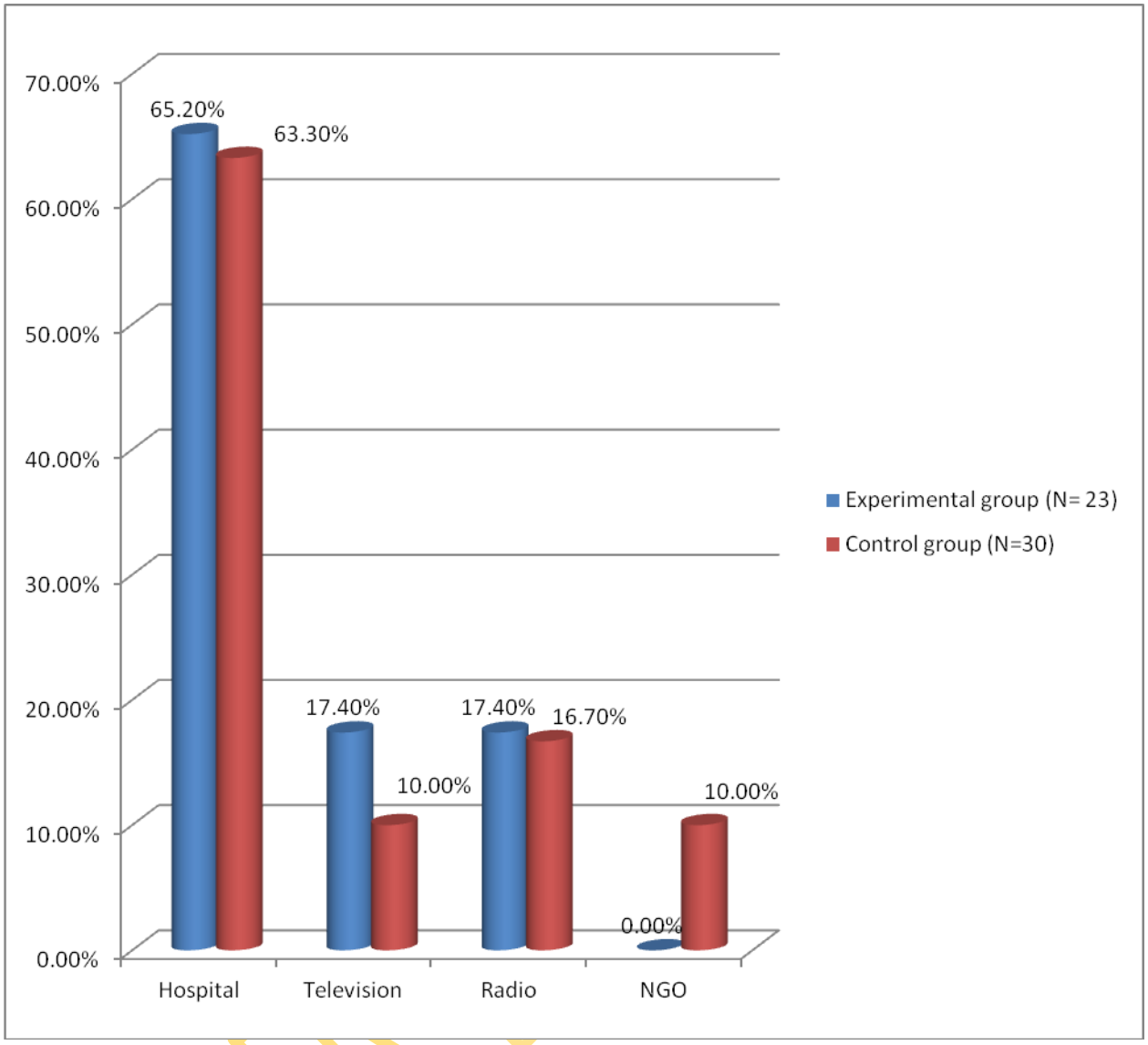

Sources of Information

Fig 4.5- Sources of information about family planning among the experimental and control group at pre-training

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Table 4.10 - Experimental and control groups' general knowledge of family planning at pre-training

Statement	Pre-training		Post-training	
Definition of family planning	**Experimental (N=23)**	**Control (=30)**	**Experimental (N=23)**	**Control (=30)**
Correct response	21 (91.3)	30 (100)	23(100)	30 (100)
Incorrect response	2 (8.7)	0 (0.0)	0 (0.0)	0 (0.0)

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Table 4.11- Experimental and control groups' general knowledge of family planning methods/Types of contraceptives at pre-training and post-training.

Statement	Pre-training		Post-training	
	Experimental (N=23) No (%)	Control (=30) No (%)	Experimental (N=23)	Control (=30)
IUCD				
Yes	11 (47.8)	16 (53.3)	15 (65.2)	16 (53.3)
No	0 (0.0)	0 (0.0)	0 (0.0)	1 (3.3)
Do not know	12 (52.2)	14 (46.7)	8 (34.8)	13 (46.7)
Condom				
Yes	5 (21.7)	16 (53.3)	7 (30.4)	16 (53.3)
No	0 (0.0)	0 (0.0)	0 (0.0)	4 (13.3)
Do not know	18 (78.3)	14 (46.7)	16 (69.6)	10 (33.3)
Oral contraceptives				
Yes	10 (43.5)	24 (80.0)	14 (60.9)	24 (80.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	13 (56.5)	6 (20.0)	9 (39.1)	6 (20.0)
Injectibles				
Yes	15 (65.2)	16 (53.3)	20 (87.0)	17 (56.7)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	8 (34.8)	14 (46.7)	3 (13.0)	13 (43.3)
Sterilization				
Yes	2 (8.7)	7 (23.3)	0 (0.0)	7 (23.3)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	21 (91.3)	23 (76.7)	23 (100)	23 (76.7)

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Implants				
Yes	0 (0)	5 (16.7)	2 (8.6)	5 (16.7)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	25 (83.3)	21 (91.3)	25 (83.3)
Diaphragm				
Yes	0 (0)	5 (16.7)	0 (0.0)	5 (16.7)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	25 (83.3)	23 (100)	25 (83.3)
Rhythm				
Yes	0 (0)	3 (10.0)	0 (0.0)	3 (10.0)
No	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not Know	23 (0)	27 (90.0)	23(100)	27 (90.0)
Traditional				
Yes	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)
No	0 (0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	30 (100)	23 (100)	30 (100)
Natural				
Yes	0 (0.0)	6 (20.0)	0 (0.0)	6 (20.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	24 (80.0)	23 (100)	24 (80.0)

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Table 4.12 - Experimental and control groups' knowledge of the side effects of contraceptives at pre-training and post-training

Statement	Pre-training		Post-training	
	Experimental (N=23)	**Control (=30)**	**Experimental (N=23)**	**Control (=30)**
Weight Gain				
Yes	3 (13.0)	17 (56.7)	7 (30.4)	17 (56.7)
No	1 (4.3)	0 (0)	0 (0.0)	0 (0.0)
Do not know	19 (82.6)	13 (43.3)	16 (69.6)	13 (43.3)
Affects Fertility				
Yes	6 (26.1)	6 (20.0)	4 (17.4)	6 (20.0)
No	0 (0)	1 (3.3)	0 (0.0)	1 (3.3)
Do not know	17 (73.9)	23 (76.7)	19 (82.6)	23 (76.7)
Menstrual Irregularities				
Yes	7 (30.4)	15 (50.0)	5 (21.7)	15 (50.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	16 (69.6)	15 (50.0)	18 (78.3)	50.0
IUCD falls in				
Yes	0 (0.0)	2(6.7)	3 (13.0)	2(6.7)
No	0 (0.0)	1 (3.3)	0 (0.0)	1 (3.3)
Do not know	23 (100)	27(90.0)	20 (100)	27(90.0)

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4.3.3 Participants' knowledge on nutrients at pre-training

Participants' knowledge relating to nutrients as shown in table 4:15 indicates that majority in the experimental group (91.3%) and the control group (90.0%) knew that nutrients are constituents in food items. On the types of nutrients, carbohydrate was mentioned by 60.9% of the experimental group and a slightly similar number (60.0%) of the control group while protein was mentioned by 69.6% in the experimental group and 56.7% of the control group. Eight participants (34.8%) stated fats and oil as a type of nutrient in the experimental group and for control twelve participants (40.0%) stated same. Slightly above half (52.2%) in the experimental group and 16.7% in the control affirmed vitamins to be nutrients while 26.1% in the experimental group and 16.7% in the control stated correctly that minerals are nutrients.

4.3.4 Participants' knowledge on nutrients at post-training:

As seen from the table 4.15 there was an improvement in the knowledge of respondents with the experimental group being more knowledgeable than the control group. Both groups were quite knowledgeable on what nutrients were and were able to mention the types.

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Table 4.13- Experimental and control groups' general knowledge of the types of nutrients at pre-training and post-training

Statement	Pre-training		Post-training	
	Experimental (N=23)	**Control (=30)**	**Experimental (N=23)**	**Control (=30)**
Nutrients are constituents in food				
True	21 (91.3)	27 (90.0)	22 (95.7)	22 (90.0)
False	0 (0.0)	1 (3.3)	0 (0.0)	1 (3.3)
Do not know	2 (8.7)	2 (6.7)	1 (4.3)	2 (6.7)
Carbohydrate is a type of nutrient				
True	14 (60.9)	18 (60.0)	16 (69.6)	18 (60.0)
No	0 (0.0)	1 (3.3)	0 (0.0)	1 (3.3)
Do not know	9 (39.1)	11 (36.7)	7 (30.4)	11 (36.7)
Protein is a type of nutrient				
True	16 (69.6)	17 (56.7)	19 (82.6)	17 (56.7)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	7 (30.4)	13 (43.3)	4 (17.4)	13 (43.3)
Fats& Oil is a type of nutrient				
True	8 (34.8)	12 (40.0)	8 (34.8)	12 (40.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	15 (65.2)	18 (60.0)	15 (65.2)	18 (60.0)
Vitamin is a type of nutrient				

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True	12 (25.2)	13 (3.3)	13 (56.5)	13 (43.3)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	11 (47.8)	17 (56.7)	10 (43.5)	17 (56.7)
Mineral is a type of nutrient				
True	6 (26.1)	5 (16.7)	13 (56.5)	5 (16.7)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	17 (73.9)	25 (83.3)	10 (43.5)	25 (83.3)

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4.3.5 Participants' knowledge about the nutritional implication of contraceptives at pre-training and post-training

Participants' general knowledge on the effects of contraceptives on nutrients at pre-training is shown in table 4.16. Only 21.7% of both the experimental and control group were aware that contraceptives had effects on nutrients and a small percentage could accurately state the nutrients that were affected by hormonal contraceptives.

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Table 4.14: Experimental and controls groups' knowledge on effects of HC on nutrients at pre-training and post-training

Statement	Pre-training		Post-training	
	Experimental (N=23)	Control (=30)	Experimental (N=23)	Control (=30)
Contraceptives affect nutrients				

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Yes	5 (21.7)	6 (20.0)	11 (47.8)	6 (20.0)
No	13 (56.7)	13 (43.3)	0 (0.0)	13 (43.3)
Do not know	5 (21.7)	11 (36.7)	12 (52.2)	11 (36.7)
Contraceptives affect vitamin B6 in the body				
Yes	1 (4.3)	3 (10.0)	8 (34.8)	3 (10.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	22 (95.7)	27 (90.0)	15 (55.2)	27 (90.0)
Contraceptives affect folic acid in the body				
Yes	4 (8.7)	1 (3.3)	7 (30.4)	1 (10.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	21 (91.3)	29 (96.7)	16 (69.6)	29 (96.7)
Contraceptives affect Iron in the body				
Yes	0 (0.0)	1 (3.3)	6 (26.1)	1 (3.3)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	29 (96.7)	17 (73.9)	29 (96.7)
Contraceptives affect Zinc in the body				
Yes	0 (0.0)	0 (0.0)	5 (21.7)	0 (0.0)
No	0 (0.0)	0 (0.0)	0 (0.0)	0 (0.0)
Do not know	23 (100)	29 (96.7)	18 (78.3)	29 (96.7)

4.4 Comparison of the participants' overall means knowledge scores of the experimental and control groups at pre-training

Table 4.17, shows overall mean knowledge score of the experimental and control group. Overall score for the experimental group was 24.1±9.5 and that of the control was 25.9±11.2 with no significant difference ($t=0.56$, $p>0.05$). There was a significant difference in the overall means knowledge score for family planning for the experimental

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(6.78±4.1) and control (9.53±3.3) groups (t=0.01, p=<0.05). However, the mean knowledge score on nutrients and the nutritional implication of contraceptives for both groups showed no statistical significant (t = 0.91, p >0.05, t=0.91, >0.05) respectively.

4.5 Comparison of the participants' overall means knowledge scores of the experimental and control groups at post-training

Table 4.18, shows overall mean knowledge score of the experimental and control group. Overall score for the experimental group was 33.7±6.2 and that of the control was 25.9±11.2 with a significant difference (t=0.004, p<0.05). There was no significant difference in the overall means knowledge score for family planning for the experimental (8.52±2.2) and control (9.53±3.3) groups (t=0.21, p=>0.05). However, the mean knowledge score on nutrients showed no statistical significant (t = 0.20, p >0.05) while and the nutritional implication of contraceptives showed a statistical significant t=0.00, <0.05).

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Table 4.15: Comparison of the participants' overall mean knowledge scores of the experimental and control groups at pre-training and post-training

Statement	Overall mean Scores	Family planning	Nutrient scores	Nutrient Metabolism scores

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		scores		
Pre-training **Mean ± SD**				
Experimental Group (23)	24.1 ± 9.5	6.78 ± 4.1	15.43 ± 6.9	1.96 ± 4.0
Control group (30)	25.9 ± 11.2	9.53 ± 3.3	14.5 ± 7.8	1.83 ± 4.0
t	0.57	0.01	0.70	0.91
p	>0.05	<0.05	>0.05	>0.05
Post-training **Mean ± SD**				
Experimental Group (23)	33.7 ± 6.2	8.52 ± 2.2	16.9 ± 5.4	8.30 ± 4.7
Control group (30)	25.9 ± 11.2	9.53 ± 3.3	14.5 ± 7.8	1.83 ± 4.0
t	0.004	0.21	0.20	0.00
p	<0.05	>0.05	>0.05	<0.05

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4.6 Comparison of participants overall mean knowledge scores of the experimental and control groups at pre-training by categories

Table 4.19 indicates there was no significant difference in the mean knowledge score by age group for both experimental group (2.26±0.6) and control group (2.27±0.5), (t=0.97, p>0.05). The mean knowledge score by education for both groups (1.70±0.7, 2.10±0.6) with

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a significant difference (t=0.03, p< 0.05). Mean knowledge score by occupation for the experimental group (0.78±1.0) and control group (0.93±1.10) showed no significant difference (t=0.61, p>0.05). However, the mean knowledge score by religion was 1.61±0.5 and 1.63±0.5 for experimental and control groups' respectively with no statistical significant (t = 0.86, p >0.05). There was a significant difference observed in the mean knowledge score by method of contraception used (t=0.02, p<0.05).

4.7 Comparison of the participants overall mean knowledge scores of the experimental and control groups post-training by categories

Table 4.20 indicates there was no significant difference in the mean knowledge score by age group for both experimental group (2.26±0.6) and control group (2.27±0.5), (t=0.97, p>0.05). The mean knowledge score by education for both groups (1.70±0.7, 2.10±0.6) with a significant difference (t=0.03, p< 0.05). Mean knowledge score by occupation for the experimental group (0.78±1.0) and control group (0.93±1.10) with no significant difference (t=0.61, p>0.05). However, the mean knowledge score by religion was 1.61±0.5 and 1.63±0.5 for experimental and control groups' respectively with no statistical significant (t = 0.86, p >0.05). There was a significant difference observed in the mean knowledge score by method of contraception used (t=0.02, p<0.05).

Table 4.16: Comparison of participants overall mean knowledge scores of the experimental and control groups at pre-training by categories

Test period	N Experimental	Mean ± SD	N Control	Mean ± SD	t	p
Overall mean scores:	23	24.1 ± 9.5	30	25.9 ± 11.2	0.56	>0.05
Mean scores by age group						
Age group	23	2.26 ± 0.6	30	2.27 ± 0.5	0.97	>0.05

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Mean knowledge scores at pre-test by education						
Education	23	1.70 ± 0.7	30	2.10 ± 0.6	0.03	<0.05
Mean knowledge scores at pre-test by Occupation						
Occupation	23	0.78 ± 1.0	30	0.93 ± 1.1	0.61	>0.05
Mean knowledge scores at pre-test by religion						
Religion	23	1.61 ± 0.5	30	1.63 ± 0.5	0.86	>0.05
Mean knowledge scores at pre-test by marital status						
Marital status	23	3.00 ± 0.0	30	3.00 ± 0.0	*	>0.05
Mean knowledge scores at pre-test by method of contraceptive used						
Contraceptives	23	2.39 ± 0.7	30	1.90 ± 0.8	0.02	<0.05

- Cannot be computed because standard deviation is zero

Table 4.17: Comparison of the participants overall mean knowledge scores of the experimental and control groups post-training by categories

Test period	N Experimental	Mean ± SD	N Control	Mean ± SD	t	p
Overall mean scores:	23	33.7 ± 6.2	30	25.9 ± 11.2	0.002	>0.05
Mean scores by age group						

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Age group	23	2.26 ± 0.6	30	2.27 ± 0.5	0.97	>0.05
Mean knowledge scores at pre-test by education						
Education	23	1.70 ± 0.7	30	2.10 ± 0.6	0.03	>0.05
Mean knowledge scores at pre-test by Occupation						
Occupation	23	0.78 ± 1.0	30	0.93 ± 1.1	0.61	>0.05
Mean knowledge scores at pre-test by religion						
Religion	23	1.61 ± 0.5	30	1.63 ± 0.5	0.86	>0.05
Mean knowledge scores at pre-test by marital status						
Marital status	23	3.00 ± 0.0	30	3.00 ± 0.0	*	>0.05
Mean knowledge scores at pre-test by method of contraceptive used						
Contraceptives	23	2.39 ± 0.7	30	1.90 ± 0.8	0.02	>0.05

- Cannot be computed because standard deviation is zero

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4.8 Comparison of the participants overall mean knowledge scores of the experimental group at pre-training

Table 4.21 indicates there was a significant difference in the mean knowledge score by age group (F=9.95, p=0.001). For education, the mean knowledge score showed no significant difference (F=0.51, p=0.68). Mean knowledge score was also not significant (F=0.40, p=0.76) for respondents' by occupation. There was no significant difference observed in the mean knowledge score by method of contraception used (F=2.10, p=0.15). The mean

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knowledge score for respondents' religion was also not statistically significant (t = 0.41, p >0.05).

4.9 Comparison of the participants overall mean knowledge scores of the experimental group at post-training

Table 4.22 indicates there was no significant difference in the mean knowledge score by age group (F=0.96, p=0.91). For education, the mean knowledge score showed no significant difference (F=0.32, p=0.81). Mean knowledge score for occupation showed no significant (F=0.31, p=0.82) difference for respondents' in the experimental group. There was no significant difference observed in the mean knowledge score for method of contraception used (F=1.23, p=0.31). The mean knowledge score for respondents' religion was also not statistically significant (t = 0.15, p >0.05).

4.10 Comparison of the participants overall mean knowledge scores of the control group at pre-training

Table 4.23 indicates there was no significant difference in the mean knowledge score by age group (F=0.71, p=0.41). For education, the mean knowledge score showed no significant difference also (F=1.30, p=0.30). Mean knowledge score was also not significant (F=0.70, p=0.60) for respondents' by occupation. There was no significant difference observed in the mean knowledge score by method of contraception used (F=0.50, p=0.64). The mean knowledge score for respondents' religion was also not statistically significant (t = 0.33, p >0.05).

4.11 Comparison of the participants overall mean knowledge scores of the control group at post-training

Table 4.24 indicates there was no significant difference in the mean knowledge score by age group (F=0.71, p=0.41). For education, the mean knowledge score showed no significant difference also (F=1.30, p=0.30). Mean knowledge score was also not significant (F=0.70, p=0.60) for respondents' by occupation. There was no significant difference observed in the mean knowledge score by method of contraception used (F=0.50, p=0.64). The mean knowledge score for respondents' religion was also not statistically significant (t = 0.33, p >0.05).

4.12 Comparison of the participants means family planning knowledge scores of the experimental group at pre-training

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Table 4.25, shows participants in the experimental groups means family planning knowledge scores. There was no significant difference in the mean knowledge score for the age groups 15-24 (13.0±1.4), 25-34 (6.50±4.0) and 35-45 (5.60±9.1) (F= 3.13, p= 0.06). The mean knowledge score for education showed no significant difference (F= 0.60, p= 0.65). Mean knowledge score for occupation was with a significant difference (F=0.56, p=0.65). Also there was no significant difference observed by the method of contraception used (F=0.33, p=0.72). Mean knowledge score by religion was 8.00±4.00 and 6.00±4.01 for Christianity and Islam respectively had no statistical significant (t = 0.26, p >0.05).

4.13 Comparison of the participants means family planning knowledge scores of the experimental group at post-training

Table 4.26, shows participants in the experimental groups means family planning knowledge scores. A significant difference was observed in the mean knowledge score for the age groups 15-24 (5.00±1.41), 25-34 (8.50±1.67) and 35-45 (9.50±2.33) (F= 4.45, p= 0.03). The mean knowledge score for education showed no significant difference (F= 0.46, p= 0.71). Mean knowledge score for occupation was without a significant difference (F=0.76, p=0.53). Also there was no significant difference observed by the method of contraception used (F=1.66, p=0.22). Mean knowledge score by religion was 7.90±2.11 and 9.00±2.18 for Christianity and Islam respectively had no statistical significant (t = 0.20, p >0.05).

4.14 Comparison of the participants means family planning knowledge scores of the control group at pre-training

Table 4.27, shows the means family planning knowledge scores of the participants of the control group. There was a significant difference in the mean knowledge score of the age groups 25-34 (10.5±2.50) and 35-45 (6.75±3.70) (F= 10.52, p= 0.003). The mean knowledge score ranged from 11.5±1.92 to 10.3±2.70 among those with primary education and tertiary education respectively with no significant difference (F= 1.37, p= 0.30). Mean knowledge score for occupation ranged from those with unskilled occupations (8.90±3.80) to the professionals (9.33±1.16) with no significant difference (F=0.83, p=0.49). Also there was no significant difference observed in the mean knowledge score for the method of contraception used (F=2.91, p=0.072). By religion, the mean knowledge score of participants was 9.45±3.70 and 9.58±3.10 for Christians and Muslims respectively with no statistical significant difference (t = 0.93, p > 0.05).

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4.15 Comparison of the participants means family planning knowledge scores of the control group at post-training

Table 4.28, shows the means family planning knowledge scores of the participants of the control group. There was a significant difference in the mean knowledge score of the age groups 25-34 (10.5±2.50) and 35-45 (6.75±3.70) (F= 10.52, p= 0.003). The mean knowledge score ranged from 11.5±1.92 to 10.3±2.70 among those with primary education and tertiary education respectively with no significant difference (F= 1.37, p= 0.30). Mean knowledge score for education ranged from those with unskilled occupations (8.90±3.80) to the professionals (9.33±1.16) with no significant difference (F=0.83, p=0.49). Also there was no significant difference observed in the mean knowledge score for the method of contraception used (F=2.91, p=0.07). By religion, the mean knowledge score of participants was 9.45±3.70 and 9.58±3.10 for Christians and Muslims respectively with no statistical significant difference (t = 0.93, p > 0.05).

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Table 4.18: Comparison of the participants overall mean knowledge scores of the experimental group at pre-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value	t-value
Experimental groups mean knowledge scores at pre-training by age group					
15 – 24	2	45.5 ± 2.1			

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25 – 34	13	21.9 ± 6.0	9.95	0.001
35 – 44	8	22.6 ± 9.1		
Experimental groups mean knowledge scores at pre-training by educational qualification				
No formal education	1	22.0 ±		
Primary education	7	20.6 ± 7.1		
Secondary education	13	25.9 ± 11.4	0.505	0.68
Tertiary education	2	27.0 ± 0.00		
Experimental groups mean knowledge scores at pre-training by occupation				
Unskilled	13	23.9 ± 9.1		
Skilled manual	3	19.3 ± 7.8		
Skilled non-manual	6	26.7 ± 12.4	0.40	0.76
Professional	1	27.0		
Experimental groups mean knowledge scores at pre-training by contraceptive used				
Oral contraceptive	2	36.5 ± 14.9		
Injectibles	10	23.8 ± 6.20	2.10	0.15
IUCD	11	22.3 ± 10.5		
Experimental groups mean knowledge scores at pre-training by Religion				
Christian	9	26.3 ± 9.99		
Islam	14	22.8 ± 9.40		>0.05 0.41
Experimental groups mean				

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knowledge scores at pre-training by ethnicity				
Yoruba	22	24.3 ± 9.80		
Igbo	1	22.0 ±	0.05	0.82

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Table 4.19: Comparison of the participants overall mean knowledge scores for experimental group at post-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at post-training by age group					
15 – 24	2	32.5 ± 2.1			
		96			

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25 – 34	13	34.2 ± 6.0	0.96	0.91
35 – 44	8	33.3 ± 7.6		
Experimental groups mean knowledge scores at post-training by educational qualification				
No formal education	1	40.0 ±		
Primary education	7	33.4 ± 9.1		
Secondary education	13	33.6 ± 4.7	0.32	0.81
Tertiary education	2	33.0 ± 7.1		
Experimental groups mean knowledge scores at post-training by occupation				
Unskilled	13	33.6 ± 7.5		
Skilled manual	3	35.0 ± 7.8		
Skilled non-manual	6	34.3 ± 3.1	0.31	0.82
Professional	1	28.0		
Experimental groups mean knowledge scores at post-training by contraceptive used				
Oral contraceptive	2	33.5 ± 0.7		
Injectibles	10	36.0 ± 3.9	1.23	0.31
IUCD	11	31.7 ± 7.9		
Experimental groups mean knowledge scores at post-training by Religion				
Christian	9	36.1 ± 4.7		
Islam	14	32.2 ± 6.6		>0.05 0.15
Experimental groups mean				

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knowledge scores at post-training				
by ethnicity				
Yoruba	22	33.3 ± 6.0		
Igbo	1	43.0 ±	0.05	0.82

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Table 4.20: Comparison of the participants overall mean knowledge scores of the control group at pre-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at pre-training by age group					
25 – 34	22	26.9 ± 12.3			

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35 – 44	8	23.0 ± 6.80	0.71	0.41	
Experimental groups mean knowledge scores at pre-training by educational qualification					
Primary education	4	34.0 ± 13.6			
Secondary education	19	24.6 ± 11.3	1.30	0.30	
Tertiary education	7	24.6 ± 8.43			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	24.5 ± 11.5			
Skilled manual	3	20.3 ± 10.4			
Skilled non-manual	8	30.0 ± 12.2	0.70	0.60	
Professional	3	27.7 ± 6.4			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	27.2 ± 13.0			
Injectibles	11	23.3 ± 9.9	0.50	0.64	
IUCD	8	27.5 ± 10.9			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	28.6 ± 7.53			
Islam	19	24.3 ± 12.7		>0.05	0.33
Experimental groups mean knowledge scores at pre-training by ethnicity					

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Yoruba	28	26.8 ± 11.1		
Igbo	1	17.0 ±	1.20	0.32
Hausa	1	12.0 ±		

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Table 4.21: Comparison of the participants overall mean knowledge scores for control group at post- training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at post-training by age group					
25 – 34	22	26.9 ± 12.3			

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35 – 44	8	23.0 ± 6.80	0.71	0.41	
Experimental groups mean knowledge scores at post-training by educational qualification					
Primary education	4	34.0 ± 13.6			
Secondary education	19	24.6 ± 11.3	1.30	0.30	
Tertiary education	7	24.6 ± 8.43			
Experimental groups mean knowledge scores at post-training by occupation					
Unskilled	16	24.5 ± 11.5			
Skilled manual	3	20.3 ± 10.4			
Skilled non-manual	8	30.0 ± 12.2	0.70	0.60	
Professional	3	27.7 ± 6.4			
Experimental groups mean knowledge scores at post-training by contraceptive used					
Oral contraceptive	11	27.2 ± 13.0			
Injectibles	11	23.3 ± 9.9	0.50	0.64	
IUCD	8	27.5 ± 10.9			
Experimental groups mean knowledge scores at post-training by Religion					
Christian	11	28.6 ± 7.53			
Islam	19	24.3 ± 12.7		>0.05	0.33
Experimental groups mean knowledge scores at post-training by ethnicity					

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Yoruba	28	26.8 ± 11.1		
Igbo	1	17.0 ±	2.50	0.13
Hausa	1	12.0 ±		

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Table 4.22: Comparison of the participants means family planning knowledge scores of the experimental group at pre-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at pre-training by age group					
15 – 24	2	13.0 ± 1.4			
25 – 34	13	6.50 ± 4.0	3.13	0.06	

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35 – 44	8	5.60 ± 9.1			
Experimental groups mean knowledge scores at pre-training by educational qualification					
No formal education	1	12.0 ±			
Primary education	7	6.30 ± 3.60			
Secondary education	13	6.62 ± 4.12	0.60	0.65	
Tertiary education	2	7.00 ± 7.10			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	6.62 ± 3.90			
Skilled manual	3	6.00 ± 3.50			
Skilled non-manual	6	6.67 ± 5.20	0.56	0.65	
Professional	1	12.0			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	9.00 ± 4.24			
Injectibles	10	6.80 ± 3.60	0.33	0.72	
IUCD	11	6.36 ± 4.72			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	8.00 ± 4.00			
Islam	14	6.00 ± 4.01		>0.05	0.26
Experimental groups mean knowledge scores at pre-training					

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by ethnicity				
Yoruba	22	6.55 ± 4.01		
Igbo	1	12.0 ±	1.77	0.20

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Table 4.23: Comparison of the participants' means family planning knowledge scores of the experimental group at post-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at pre-training by age group					
15 – 24	2	5.00 ± 1.41			
25 – 34	13	8.50 ± 1.67	4.45	0.03	

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35 – 44	8	9.50 ± 2.33			
Experimental groups mean knowledge scores at pre-training by educational qualification					
No formal education	1	10.0 ±			
Primary education	7	9.14 ± 2.27			
Secondary education	13	8.15 ± 2.37	0.46	0.71	
Tertiary education	2	8.00 ± 0.00			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	8.62 ± 2.22			
Skilled manual	3	10.0 ± 2.00			
Skilled non-manual	6	7.67 ± 2.34	0.76	0.53	
Professional	1	8.00			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	6.00 ± 2.82			
Injectibles	10	9.00 ± 1.70	1.66	0.22	
IUCD	11	8.60 ± 2.40			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	7.90 ± 2.11			
Islam	14	9.00 ± 2.18		>0.05	0.20
Experimental groups mean knowledge scores at pre-training					

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by ethnicity				
Yoruba	22	8.55 ± 2.24		
Igbo	1	8.00 ±	0.57	0.81

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Table 4.24: Comparison of the participants means family planning knowledge scores of the control group at pre-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value t-value**
Experimental groups mean knowledge scores at pre-training by age group				
25 – 34	22	10.5 ± 2.50		
35 – 44	8	6.75 ± 3.70	10.52	0.003

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Experimental groups mean knowledge scores at pre-training by educational qualification					
Primary education	4	11.5 ± 1.92			
Secondary education	19	8.84 ± 3.55	1.37	0.30	
Tertiary education	7	10.3 ± 2.70			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	8.90 ± 3.80			
Skilled manual	3	12.0 ± 0.00			
Skilled non-manual	8	10.0 ± 3.02	0.83	0.49	
Professional	3	9.33± 1.16			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	10.9 ± 2.88			
Injectibles	11	7.82 ± 3.30	2.91	0.072	
IUCD	8	10.0 ± 10.0			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	9.45 ± 3.70			
Islam	19	9.58 ± 3.10		>0.05	0.93
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	28	9.71 ± 3.02			
Igbo	1	12.0 ±	3.50	0.04	

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Hausa	1	2.00 ±			

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Table 4.25: Comparison of the participants' means family planning knowledge scores of the control group at post training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at pre-training by age group					
25 – 34	22	10.5 ± 2.50			
35 – 44	8	6.75 ± 3.70	10.52	0.003	
Experimental groups mean					

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knowledge scores at pre-training by educational qualification					
Primary education	4	11.5 ± 1.92			
Secondary education	19	8.84 ± 3.55	1.37	0.30	
Tertiary education	7	10.3 ± 2.70			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	8.90 ± 3.80			
Skilled manual	3	12.0 ± 0.00			
Skilled non-manual	8	10.0 ± 3.02	0.83	0.49	
Professional	3	9.33± 1.16			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	10.9 ± 2.88			
Injectibles	11	7.82 ± 3.30	2.91	0.072	
IUCD	8	10.0 ± 10.0			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	9.45 ± 3.70			
Islam	19	9.58 ± 3.10		>0.05	0.93
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	28	9.71 ± 3.02			
Igbo	1	12.0 ±	3.50	0.04	
Hausa	1	2.00 ±			

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4.16 Comparison of the participants means nutrients knowledge scores of the experimental group at pre-training

Table 4.29, shows experimental participants groups' means nutrients knowledge scores. There was no significant difference in the mean knowledge score for the age groups 15-24 (22.5±3.5), 25-34 (1.42±6.1) and 35-45 (15.6±8.2) (F= 1.30, p= 0.30). The mean knowledge score for education showed no significant difference (F= 2.1, p= 0.14). Mean knowledge score for occupation was with no significant difference (F=0.78, p=0.52). Also there was no significant difference observed by the method of contraception used (F=0.66, p=0.53). Mean knowledge score by religion was 15.00±8.0 and 15.71±6.5 for Christianity and Islam respectively had no statistical significant (t = 082, p >0.05).

4.17 Comparison of the participants means nutrients knowledge scores of the experimental group at post-training

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Table 4.30, shows experimental participants groups' means nutrients knowledge scores. There was no significant difference in the mean knowledge score for the age groups 15-24 (20.0±7.1), 25-34 (16.5±5.2) and 35-45 (16.9±5.4) (F= 0.34, p= 0.72). The mean knowledge score for education showed no significant difference (F= 0.12, p= 0.95). Mean knowledge score for occupation was without a significant difference (F=0.44, p=0.72). Also there was no significant difference observed by the method of contraception used (F=0.37, p=0.70). Mean knowledge score by religion was 17.8±2.6 and 16.4±6.6 for Christianity and Islam respectively had no statistical significant (t = 050, p >0.05).

4.18 Comparison of the participants means nutrients knowledge scores of the control group at pre-training

Table 4.31, shows the means nutrients knowledge scores of the participants of the control group. There was no significant difference in the mean knowledge score of the age groups 25-34 (14.1±8.5) and 35-45 (15.6±5.6) (F= 0.22, p= 0.64). The mean knowledge score ranged from 18.6±9.5 to 14.2±7.9 among those with primary education and tertiary education, respectively with no significant difference (F= 0.74, p= 0.50). Mean knowledge score for occupation ranged from those with unskilled occupations (14.4±7.7) to the professionals (18.3±5.8) with no significant difference (F=2.22, p=0.11). Also there was no significant difference observed in the mean knowledge score for the method of contraception used (F=0.25, p=0.80). By religion, the mean knowledge score of participants was 16.4±4.5 and 13.4±9.2 for Christians and Muslims respectively with no statistical significant difference (t = 0.25, p > 0.05).

4.19 Comparison of the participants means nutrients knowledge scores of the control group at post-training

Table 4.32, shows the means nutrients knowledge scores of the participants of the control group. There was no significant difference in the mean knowledge score of the age groups 25-34 (14.1±8.5) and 35-45 (15.6±5.6) (F= 0.22, p= 0.64). The mean knowledge score ranged from 18.6±9.5 to 14.2±7.9 among those with primary education and tertiary education respectively with no significant difference (F= 0.74, p= 0.50). Mean knowledge score for occupation ranged from those with unskilled occupations (14.4±7.7) to the professionals (18.3±5.8) with no significant difference (F=2.22, p=0.11). Also there was no significant difference observed in the mean knowledge score for the method of

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contraception used (F=0.25, p=0.80). By religion, the mean knowledge score of participants was 16.4±4.5 and 13.4±9.2 for Christians and Muslims respectively with no statistical significant difference (t = 0.25, p > 0.05).

4.20 Comparison of the participants means nutrient utilization knowledge scores of the experimental group at pre-training

Table 4.33, shows participants in the experimental groups means nutrient metabolism knowledge scores. There was a significant difference in the mean knowledge score for the age groups 15-24 (10.0±7.1), 25-34 (1.15±3.0) and 35-45 (1.25±2.3) (F= 7.3, p= 0.004). The mean knowledge score for education showed no significant difference (F= 0.24, p= 0.87). Mean knowledge score for occupation was with no significant difference (F=0.83, p=0.50). Also there was no significant difference observed by the method of contraception used (F=0.83, p=0.50). Mean knowledge score by religion was 3.33±5.60 and 1.07±2.13 for Christianity and Islam respectively had no statistical significant (t = 0.28, p >0.05).

4.21 Comparison of the participants means nutrient utilization knowledge scores of the experimental group at post-training

Table 4.34, shows participants in the experimental groups means nutrient metabolism knowledge scores. There was no significant difference in the mean knowledge score for the age groups 15-24 (7.50±10.6), 25-34 (9.23±4.00) and 35-45 (6.90±4.60) (F= 0.64, p= 0.54). The mean knowledge score for education showed no significant difference (F= 0.78, p= 0.97). Mean knowledge score for occupation was with no significant difference (F=0.78, p=0.97). Also there was no significant difference observed by the method of contraception used (F=0.30, p=0.86). Mean knowledge score by religion was 10.56±4.0 and 6.79±24.6 for Christianity and Islam respectively was statistical significant (t = 0.05, p =0.05).

4.22 Comparison of the participants means nutrient utilization knowledge scores of the control group at pre-training

Table 4.35, shows the means nutrient metabolism knowledge scores of the control group. There was no significant difference in the mean knowledge score of the age groups 25-34 (2.30±4.6) and 35-45 (0.63±1.8) (F= 1.0, p= 0.33). The mean knowledge score ranged from 3.75±7.5 to 1.58±3.84 among those with primary education and tertiary education respectively with no significant difference (F= 0.50, p= 0.61). Mean knowledge score for

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education ranged from those with unskilled occupations (1.25±2.9) to the professionals (0.00±0.00) with no significant difference (F=0.70, p=0.56). Also there was no significant difference observed in the mean knowledge score for the method of contraception used (F=1.28, p=0.30). By religion, the mean knowledge score of participants was 9.45±3.70 and 9.58±3.10 for Christians and Muslims respectively with no statistical significant difference (t = 0.37, p > 0.05).

4.23 Comparison of the participants means nutrient utilization knowledge scores of the control group at post-training

Table 4.36, shows the means nutrient metabolism knowledge scores of the participants of the control group. There was no significant difference in the mean knowledge score of the age groups 25-34 (2.30±4.6) and 35-45 (0.63±1.8) (F= 1.0, p= 0.33). The mean knowledge score ranged from 3.75±7.5 to 1.58±3.84 among those with primary education and tertiary education respectively with no significant difference (F= 0.50, p= 0.61). Mean knowledge score for education ranged from those with unskilled occupations (1.25±2.9) to the professionals (0.00±0.00) with no significant difference (F=0.70, p=0.56). Also there was no significant difference observed in the mean knowledge score for the method of contraception used (F=1.28, p=0.30). By religion, the mean knowledge score of participants was 9.45±3.70 and 9.58±3.10 for Christians and Muslims respectively with no statistical significant difference (t = 0.37, p > 0.05).

Table 4.26: Comparison of the participants means nutrient knowledge scores of the experimental group at pre-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value t-value
Experimental groups mean knowledge scores at pre-training by age group				
15 – 24	2	22.5 ± 3.5		
25 – 34	13	14.2 ± 6.1	1.30	0.30
35 – 44	8	15.6 ± 8.2		

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Experimental groups mean knowledge scores at pre-training by educational qualification					
No formal education	1	5.0 ±			
Primary education	7	12.1 ± 7.6			
Secondary education	13	17.7 ± 6.0	2.1		0.14
Tertiary education	2	17.5 ± 4.0			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	14.2 ± 7.1			
Skilled manual	3	13.3 ± 7.6			
Skilled non-manual	6	19.2 ± 7.0	0.78		0.52
Professional	1	15.0			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	20.0 ± 0.0			
Injectibles	10	16.0 ± 6.6	0.66		0.53
IUCD	11	14.1 ± 7.7			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	15.00 ± 8.0			
Islam	14	15.71 ± 6.5		>0.05	0.82
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	22	16.1 ± 6.2			

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Igbo	1	0.0 ±	6.57	0.02

Table 4.27: Comparison of the participants means nutrient knowledge scores of the experimental group at post-training

Socio-demographic Characteristics	**N**	**Mean ± SD**	**F-value**	**P- value**	**t-value**
Experimental groups mean knowledge scores at pre-training by age group					
15 – 24	2	20.0 ± 7.1			
25 – 34	13	16.5 ± 5.2	0.34		0.72
35 – 44	8	16.9 ± 5.4			
Experimental groups mean					

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knowledge scores at pre-training by educational qualification					
No formal education	1	20.0 ±			
Primary education	7	16.4 ± 6.9			
Secondary education	13	16.9 ± 5.2	0.12	0.95	
Tertiary education	2	17.5 ± 3.5			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	16.2 ± 6.2			
Skilled manual	3	16.7 ± 5.8			
Skilled non-manual	6	19.2 ± 3.8	0.44	0.72	
Professional	1	15.0			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	15.0 ± 0.0			
Injectibles	10	18.0 ± 3.5	0.37	0.70	
IUCD	11	16.4 ± 7.1			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	17.8 ± 2.6			
Islam	14	16.4 ± 6.6		>0.05	0.50
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	22	16.8 ± 5.5			
Igbo	1	20.0 ±	0.32	0.58	

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Table 4.28: Comparison of the participants means nutrient knowledge scores of the control group at pre-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value t-value
Experimental groups mean knowledge scores at pre-training by age group				
25 – 34	22	14.1 ± 8.5		
35 – 44	8	15.6 ± 5.6	0.22	0.64
Experimental groups mean knowledge scores at pre-training by educational qualification				
Primary education	4	18.6 ± 9.5		

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Secondary education	19	14.2 ± 7.9	0.74	0.50	
Tertiary education	7	12.9 ± 7.0			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	14.4 ± 7.7			
Skilled manual	3	5.00 ± 5.0			
Skilled non-manual	8	16.9 ± 7.5	2.22	0.11	
Professional	3	18.3± 5.8			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	13.2 ± 7.8			
Injectibles	11	15.0 ± 8.7	0.25	0.80	
IUCD	8	15.6 ± 7.3			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	16.4 ± 4.5			
Islam	19	13.4 ± 9.2		>0.05	0.25
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	28	15.2 ± 7.5			
Igbo	1	0.0 ±	2.20	0.14	
Hausa	1	10.0 ±			

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Table 4.29: Comparison of the participants means nutrient knowledge scores of the control group at post-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value	t-value
Experimental groups mean knowledge scores at pre-training by age group					
25 – 34	22	14.1 ± 8.5			
35 – 44	8	15.6 ± 5.6	0.22		0.64
Experimental groups mean knowledge scores at pre-training by educational qualification					
Primary education	4	18.6 ± 9.5			

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Secondary education	19	14.2 ± 7.9	0.74	0.50	
Tertiary education	7	12.9 ± 7.0			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	14.4 ± 7.7			
Skilled manual	3	5.00 ± 5.0			
Skilled non-manual	8	16.9 ± 7.5	2.22	0.11	
Professional	3	18.3± 5.8			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	13.2 ± 7.8			
Injectibles	11	15.0 ± 8.7	0.25	0.80	
IUCD	8	15.6 ± 7.3			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	16.4 ± 4.5			
Islam	19	13.4 ± 9.2		>0.05	0.25
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	28	15.2 ± 7.5			
Igbo	1	0.0 ±	2.20	0.14	
Hausa	1	10.0 ±			

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Table 4.30: Comparison of the participants means nutrient utilization knowledge scores of the experimental group at pre-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value t-value
Experimental groups mean knowledge scores at pre-training by age group				
15 – 24	2	10.0 ± 7.1		
25 – 34	13	1.15 ± 3.0	7.3	0.004
35 – 44	8	1.25 ± 2.3		
Experimental groups mean knowledge scores at pre-training by educational qualification				
No formal education	1	5.0 ±		

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Primary education	7	2.14 ± 4.0			
Secondary education	13	1.54 ± 4.3	0.24	0.87	
Tertiary education	2	2.50 ± 4.0			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	3.08 ± 4.8			
Skilled manual	3	0.00 ± 0.0			
Skilled non-manual	6	0.83 ± 2.0	0.83	0.50	
Professional	1	0.00			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	7.50 ± 10.6			
Injectibles	10	1.00 ± 2.11	2.66	0.09	
IUCD	11	1.82 ± 3.37			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	3.33 ± 5.60			
Islam	14	1.07 ± 2.13		>0.05	0.28
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	22	1.60 ± 3.60			
Igbo	1	10.0 ±	5.30	0.03	

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Table 4.31: Comparison of the participants means nutrient utilization knowledge scores of the experimental group at post-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value	t-value
Experimental groups mean knowledge scores at pre-training by age group					
15 – 24	2	7.50 ± 10.6			
25 – 34	13	9.23 ± 4.00	0.64		0.54
35 – 44	8	6.90 ± 4.60			
Experimental groups mean knowledge scores at pre-training by educational qualification					
No formal education	1	10.0 ±			

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Primary education	7	7.90 ± 4.9			
Secondary education	13	8.50 ± 5.2	0.78	0.97	
Tertiary education	2	7.50 ± 3.5			
Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	13	8.85 ± 4.2			
Skilled manual	3	8.33 ± 7.6			
Skilled non-manual	6	7.50 ± 5.2	0.30	0.86	
Professional	1	5.00			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	2	12.5 ± 3.5			
Injectibles	10	9.0 ± 4.0	1.55	0.24	
IUCD	11	6.82 ± 5.1			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	9	10.56 ± 4.0			
Islam	14	6.79 ± 4.6		>0.05	0.05
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	22	7.95 ± 4.5			
Igbo	1	15.0 ±	2.30	0.14	

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Table 4.32: Comparison of the participants means nutrient metabolism knowledge scores of the control group at pre-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value t-value
Experimental groups mean knowledge scores at pre-training by age group				
25 – 34	22	2.30 ± 4.6		
35 – 44	8	0.63 ± 1.8	1.0	0.33
Experimental groups mean knowledge scores at pre-training by educational qualification				
Primary education	4	3.75 ± 7.5		
Secondary education	19	1.58 ± 3.4	0.50	0.61
Tertiary education	7	1.43 ± 3.8		

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Experimental groups mean knowledge scores at pre-training by occupation					
Unskilled	16	1.25 ± 2.9			
Skilled manual	3	3.33 ± 5.8			
Skilled non-manual	8	3.13 ± 6.0	0.70	0.56	
Professional	3	0.00 ± 0.0			
Experimental groups mean knowledge scores at pre-training by contraceptive used					
Oral contraceptive	11	3.18 ± 4.6			
Injectibles	11	0.45 ± 1.5	1.28	0.30	
IUCD	8	1.90 ± 5.3			
Experimental groups mean knowledge scores at pre-training by Religion					
Christian	11	2.73 ± 4.1			
Islam	19	13.2 ± 4.0		>0.05	0.37
Experimental groups mean knowledge scores at pre-training by ethnicity					
Yoruba	28	1.79 ± 4.1			
Igbo	1	0.00 ±	0.40	0.68	
Hausa	1	5.00 ±			

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Table 4.33: Comparison of the participants means nutrient utilization knowledge scores of the control group at post-training

Socio-demographic Characteristics	N	Mean ± SD	F-value	P- value	t-value
Experimental groups mean knowledge scores at pre-training by age group					
25 – 34	22	2.30 ± 4.6			
35 – 44	8	0.63 ± 1.8	1.0		0.33
Experimental groups mean knowledge scores at pre-training by educational qualification					
Primary education	4	3.75 ± 7.5			
Secondary education	19	1.58 ± 3.4	0.50		0.61
Tertiary education	7	1.43 ± 3.8			

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Experimental groups mean knowledge scores at pre-training by occupation				
Unskilled	16	1.25 ± 2.9		
Skilled manual	3	3.33 ± 5.8		
Skilled non-manual	8	3.13 ± 6.0	0.70	0.56
Professional	3	0.00 ± 0.0		
Experimental groups mean knowledge scores at pre-training by contraceptive used				
Oral contraceptive	11	3.18 ± 4.6		
Injectibles	11	0.45 ± 1.5	1.28	0.30
IUCD	8	1.90 ± 5.3		
Experimental groups mean knowledge scores at pre-training by Religion				
Christian	11	2.73 ± 4.1		
Islam	19	13.2 ± 4.0		>0.05
	0.37			
Experimental groups mean knowledge scores at pre-training by ethnicity				
Yoruba	28	1.79 ± 4.1		
Igbo	1	0.00 ±	0.40	0.68
Hausa	1	5.00		

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SECTION D

4.24 Respondent's view on the need for nutrition counseling and education at family clinics.

Information on counseling was obtained by asking each respondent to state if she had ever been counseled nutritionally as regards contraceptive use and possible effects on nutrients; response is shown in table 4.42 (percentage distribution of respondents' response at the preliminary study). Table 4.43 shows the percentage distribution of both experimental and controls' response at pre-test and post-test as regarding the need for nutritional counseling at family planning clinics.

Also captured were participant's response on the need for feeding adequately knowing that women whose diets are not adequate will only aggravate or worsen nutritional problems with birth control pills. This can be seen in table 4.44.

Importance of nutritional supplements while on contraceptives at pre-training and post-training

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Participants were posed with a question to ascertain the importance of nutritional supplements for women who use family planning methods especially the hormonal types of contraceptives. For pre-training most in the experimental group (65.20%) and 86.7% in the control group agreed that supplements were indeed important to make up for nutrient imbalance while in the post-training 73.9% of the experimental group and 86.7% in the control group agreed that supplements were indeed important to make up for nutrient imbalance. This is shown in Fig 4.6.

Table 4.34: Respondent's response on ever being counseled nutritionally as regards contraceptive use and possible effects on nutrients N=300 (Preliminary)

Response	Frequency	Percentage (%)
Yes	45	15.0
No	216	72.9
I don't know	39	13.0

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Table 4.35: Experimental and controls groups' response on the need for nutritional counseling to be incorporated into family planning counseling at pre-training and post-training

Statement	Experimental (N=23)		Control (N=30)	
	No	%	No	%
Nutritional counseling should be considered during family planning counseling (Pre-training)				
True	20	87.0	22	73.3
False	3	13.0	2	6.7
Do not know	0	0.0	6	20.0
Nutritional counseling should be considered during family planning counseling (Post-training)				
True	23	100.0	22	73.3
False	0	0.0	8	26.7

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Table 4.36: Experimental and controls groups' response on the need for eating adequate diet while on contraceptives at Pre-training and post-training

Statement	Experimental		Control	
	No	%	No	%
Eating adequate diet is important while using contraceptives (Pre-training)				
True	17	73.9	18	60.0
False	4	17.4	2	6.7
Do not know	2	8.7	10	33.3
Eating adequate diet is important while using contraceptives (Post-training)				
True				

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False	23	100.0	18	60.0
Do not know	0	0	2	6.7
	0	0	10	33.3

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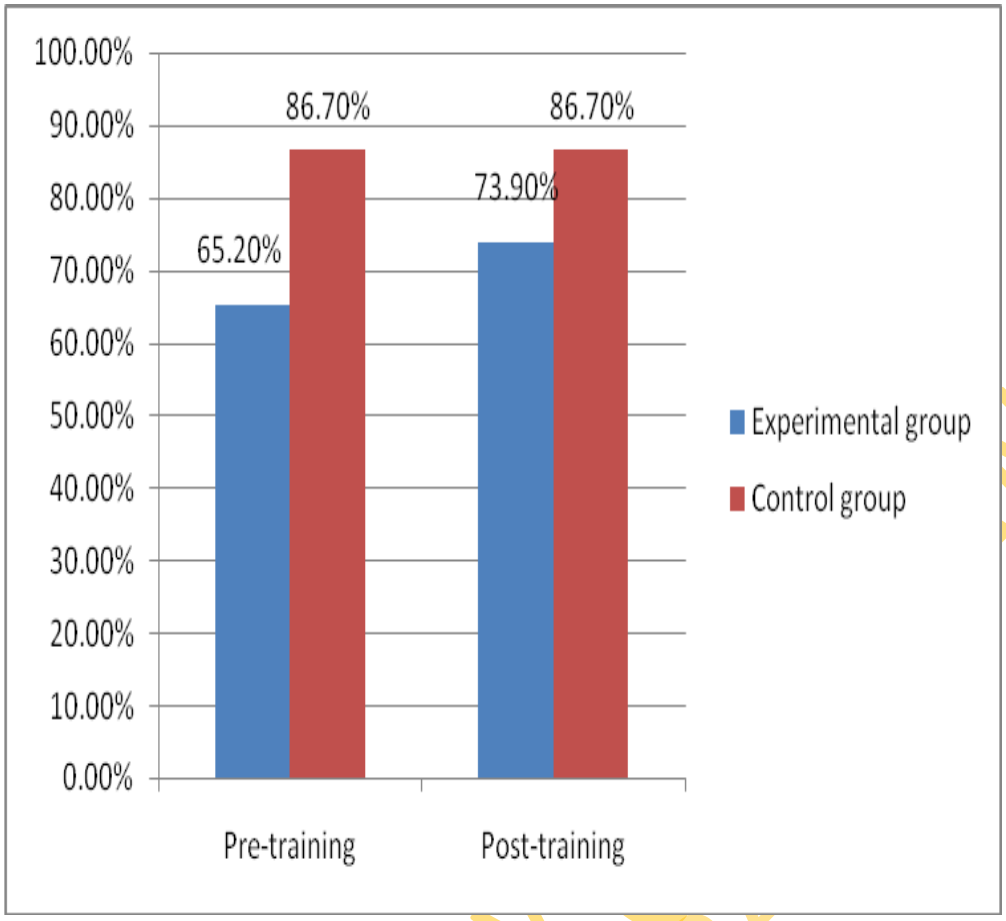

Fig 4.6: Importance of nutritional supplements while on contraceptives (Pre-training and Post training)

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CHAPTER 5

5.0 DISCUSSION CONCLUSION AND RECOMMENDATIONS

5.1 Results of the preliminary study:

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The socio-demographic characteristics of the respondents showed that most of the women who were interviewed were married (97.7%) and were between the age group of 25-34 years with mean age being 31.89 ± 5.1 which is similar to those from previous Nigerian studies (Aniekan et al., 2010; Mariga et al., 2007; Ojo, 1978).

The present study showed that women had positive attitudes towards family planning and were using it for birth spacing. This fact is well supported by the observation that 98.7% (296) of the respondents studied approved the use of family planning for birth spacing. In contrast 4 (13%) showed negative attitudes by disapproving. The high percentage observed in the approval of family planning in this study may be as a result of the many campaigns and education to the Nigerian society on the importance of birth spacing. Majority of the respondent's spouse 252 (84.0%) approved the use of contraceptives while 27(9.0%) disapproved and 21(7.0%) were unsure of their spouse perception on their use of family planning. This corresponds with previous studies (Najla, 2004).

Preference for a particular type of contraceptive among women varies from one country to another (WHO, 1998). In this study a higher percentage of women use injectibles 103 (34.3%) supporting the current scientific data that shows that the use of Depot medroxyprogesterone (DMPA) has increased remarkably throughout sub-Saharan Africa, and DMPA is increasingly becoming the most commonly used modern method of contraception in some Nigerian centers (Okpani, 2002, Mairiga et al., 2007 and Avidime et al., 2010). Also the NDHS (2008) showed with respect to modern contraceptives, Injectables (3 percent), male condoms and the pill (2 percent each) are the most widely used methods. The preference for injectibles, as observed from this study may be due to their belief that it is safe, effective and also recommended by their doctor. It is therefore logical to assume that where the users are offered a range of commodities that are safe, recommended and effective usage is likely to increase. Another factor might be that many women tend to use the same family planning method as others in their social networks (Godley, 2001).

Findings of this study supported the results observed from several studies that contraceptive choices vary markedly with age and this disparity in contraceptive use by age reveals a woman's need for contraception changes overtime as she passes for her initial child bearing years further down to when her fertility declines. In this study the younger age group (15-

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24) preferred oral contraceptive pill (7.3%); the middle age group (25-34) would rather go for Injectibles (67.0%) while the older age group (35-44) preferred IUCD (36%). The result is similar to the result obtained in a study carried out in the United States (Mosher et al., 2000). Result obtained showed the pill was leading method among women younger than 30 years.

Majority of the respondents male partners 252 (84.0%) approved to the use of family planning. This reaffirms survey findings that do not support the assumption that African men are opposed to family planning or that they have little interest in spacing and limiting births. On the contrary, there is evidence that men are aware of family planning and are open to learning more about it. Most respondents (62%) reported a joint decision on family planning with their spouse. While a lot of studies report a limiting influence of male spouses on female partner use of family planning (Ismail, 1998), other studies report a positive influence (Mwageni et al., 1998).

The present study showed that women were aware of the different methods of contraception and majority of respondents (96%) had heard of at least one method of contraception. This falls in line with findings of Aryeetey et al., (2010). The methods of contraception that most participants have heard of were: IUCD 229 (76.3%), injectibles 228 (76.0%), pills 201 (67.0%) and condom 82 (27.3%) and others. A similar result where IUCD was the most frequently mentioned method of contraception was obtained in a study carried out in Jordon and also in a community-based study of contraceptive behavior in Nigeria carried out in the year 2006 (Najla, 2004).

Women with a higher level of education exhibited a greater level of awareness of contraceptives. This confirms the fact that the use of contraceptives is more readily and widely practiced by women who are educated (Ibrahim et al., 1997, Avidime et al., 2010 and NDHS, 2008). It was a surprise to find the low awareness of condom because it is against the wide advocacy given it due to its importance in the prevention of HIV/AIDS. It is most likely that people now see it more in the light of its anti HIV value rather than its contraceptive value.

The commonest place where one could obtain information about contraceptive method from was health workers in the hospital. This was similar to other studies (Aniekan et al., 2010

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and Mariga et al., 2007) and corroborates the results found in the successive NDHS reports. This study observed the preference of married women to hospitals, health centers and clinics perhaps indicating their need for long term contraception i.e intra-uterine devices and injectibles while adolescents preferred chemist/ patent medicine shops, but at 25 years of age and older, more people went to general or private hospitals (Oye-Adeniran et al, 2005). Information on where women obtain their contraceptives is useful for family planning program managers and implementers for logistics planning (Jean et al., 2011).

Among the participants (193) 64.3% were satisfied with the method they were using and (107) 35.7% were unsatisfied. For those who were not satisfied, the most frequently cited reason was side effects (31.7%). Although greater than that observed in a study carried out in Kassala, eastern Sudan where side effects (6.14%) alongside some other factors were the common reasons for non- use of family planning, it was quite similar to this study (Abdel et al, 2011). Results were also consistent with another study (Onwuzurike et al., 2001)

5.2 The Socio-demographic characteristics of the participants that took part in the training

This quasi-experimental study was conducted to determine the effects of training on the knowledge of hormonal contraceptives use and nutrient utilization among women of the reproductive age in Ibadan North Local Government area, Nigeria.

A large proportion of the women who were interviewed were married (97.7%). This reflects the observation that contraceptives are majorly used by married women. Majority of the women in this study had secondary education 160 (53.3%). For the experimental group IUCD (47.8%) and injectibles (43.5%) were the contraceptive majorly used while for the control injectibles (36.7%) and oral contraceptives (36.7%) were the majorly used contraceptives. This is similar to study carried out in western Sudan where findings showed oral contraceptive pills as the most common method of family planning (Haggaz et al., 2009), while in neighboring Ethiopia Injectables were the most commonly preferred modern contraceptive (63.2%) followed by oral contraceptive pills (21.2%) (Weldegerima et al., 2008). Several studies have looked at contraceptive use in northern Nigeria. In Maiduguri, Mairiga et al., (2007) found injectables to be the most commonly used and female sterilization the least commonly used method. Ameh et al., 2007 also found injectables to be

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the most commonly used method (50.7% of users) in Zaria. In contrast, Mutihir et al., 2008 reported that in Jos, the IUCD was the most commonly used method by 26.1% of users.

Participants were between the age group of 25-34 years with mean age being 32.17 ± 5.3 which is similar to those obtained from previous Nigerian studies where a similar trend of mean age was observed (Aniekan et al., 2010, Mariga et al., 2007 and Ojo, 1978).

The effect of age on contraceptive use was obvious from the findings. For the experimental group, the younger age group (15-24) was found to prefer oral contraceptive and IUCD; the middle age group (25-34) would rather go for Injectibles while the older age group (35-44) preferred IUCD while for the control the middle age group (25-34) majority use oral contraceptives and for the older age group (35-44) injectible was the most common contraceptive used. For the control, age was a significant factor for contraceptive use (P=0.02).

Using the overall mean knowledge scores, education and the type of contraceptives used were determinant factors of the participants level of knowledge. Supporting this is the findings of a study carried out in Sudan to determine the use of family planning methods it was observed that couple's education in many African countries was associated with utilization of family planning (Abdel et al., 2011). This is further evidence to support intensification of girl-child education in these settings, as education will not only raise women's level of awareness about contraceptive options, but it will engender better re-productive health for themselves and possibly also for their children (Avidime et al., 2010).

A comparison of the mean knowledge scores of experimental and control groups at post-training, showed a significant difference between the experimental and control groups. This could infer that the increase in knowledge among the experimental group was due to their selective exposure to the training. Various studies (Monga et al., 2008 and Shoker, 2003) yielded this same pattern of knowledge gain while carrying out a quasi-experimental among the experimental and control groups at post-training.

Comparison of the mean knowledge scores of experimental and control group at pre-training and post-training implied a significant difference only in the experimental group. This result is in line with that obtained in a study conducted to assess the outcome of training intervention on teachers' knowledge, perception and self-efficacy for preventing

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childhood lead poisoning (Karunwi, 2009). A significant difference was observed in the pre-training and post-training scores of the experimental study group only.

5.3 Participants' knowledge regarding family planning

The level of knowledge about family planning in Nigeria and developing countries has been found to be high (Ikechebelu et al., 2005) but still poorly practiced. The post-training of this study is a confirmation of the observation of the above mentioned study as most participants had a fairly good knowledge on family planning but nevertheless there is still a need for continuous education of women on family planning programme so as to increase the utilization of family planning services.

The main reasons given by respondents from the experimental group for using family planning were to prevent unwanted pregnancy (56.5%), birth control (21.7%), Spacing children (8.7%) and resting from Child birth (4.3%) while the control groups' reasons for using family planning include: spacing of children (60.0%), prevention of unwanted pregnancy (26.7%) and birth control (13.3%) similar to the result of a study carried out in Ghana on the knowledge, perceptions and ever use of modern contraception among women in the Ga East District, Ghana (Aryeetey et al., 2010). Another study observed the major reason for using contraception was for spacing births (Najla, 2004).

As shown from the findings of this study, the hospital constituted the major source of information about family planning, contraceptives and their side effects among the experimental and control groups emphasising the need for a constant pleasant and welcoming atmosphere at the family planning centres and hospitals. The hospital occupies a vantage position in promoting the use of family planning services and other health services provided at health centres. This is in line with other studies (Mariga et al., 2007, Onwuzurike et al., 2001). The knowledge of at least one method of contraception among both groups was high. This is consistent with the findings of Onwuzurike et al., (2001) whose results showed similar findings.

Findings of the comparative analyses of the mean knowledge of the experimental and controls' groups at pre-training showed that there was no significant difference in their mean knowledge scores. This indicates that both groups were comparable at baseline as

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regarding their knowledge on family planning (Shoker, 2003). Knowledge scores of the experimental and control groups at baseline provided the grounds for detecting changes that occur in the groups which could be due to the training intervention.

From the findings were instances where the experimental group had higher correct responses than the control and vice-versa at pre-test. Participants' knowledge regarding family planning was compared at baseline between the control and experimental groups and these comparisons showed the control were more knowledgeable than the experimental group at baseline. The comparison of the mean knowledge scores at post-training within the experimental and control group groups indicated a significant difference only in the experimental group but none in the control group but the control group were still more knowledgeable than the experimental group. This should not be considered out of the ordinary, as no two groups like individuals are exactly similar in all aspects (Oshiname, 1999).

At pre-training and post-training, age was a determinant for the level of knowledge regarding family planning for the control group and for the experimental group age was a determinant at post-training. This is evident from the comparison of the mean knowledge scores by age and ethnicity respectively in the experimental and control groups.

5.4 Participants' knowledge regarding nutrients

Participants in this study, both the experimental and control displayed a good knowledge of nutrients. At pre-training both groups showed similar levels of knowledge but at post-training there was a significant difference between the mean knowledge scores of the experimental group but none in the control group. These changes in knowledge could be attributable to the training intervention. On the level of the knowledge for nutrients, ethnicity was a determinant factor at pre-training only. This is evident from the comparison of the mean knowledge scores by age and ethnicity, respectively in the experimental and control groups.

5.5 Participants' knowledge regarding nutrient metabolism

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Among the experimental and control group, 21.1% had the knowledge that contraceptives affect nutrients at pre-training. Participants' friends were the major source of information on contraceptives and its effects on nutrients in both experimental and control groups. Other mentioned sources of information were the hospital and the media.

At post-training, there was an increase (21.1% - 47.8%) in the percentage of participants who knew contraceptives affects nutrients. Although, the two groups had a similar result at baseline regarding the effects of contraceptive on nutrients the change observed in the experimental group can be credited to the training intervention. Participants' knowledge on the types of nutrients affected by contraceptives was low and there were areas in which the control group had more correct responses than the experimental group at pre-training.

Age and ethnicity were determinant factors for the level of knowledge on the effects of contraceptives on nutrients for the experimental at pre-training. This is evident from the comparison of the mean knowledge scores by age and ethnicity respectively in the experimental and control groups.

5.6 Implications of Findings for Nutrition Education

Presented in this sub-section are the necessary implications of the findings of this study for nutrition and health education activities. The level of knowledge of the effects of hormonal contraceptives was found to be low among the population studied (experimental and control) at pre-training.

5.7 Conclusion

The level of knowledge relating to the effects of hormonal contraceptives among women of the reproductive age in Ibadan North LGA prior to training intervention was low. The training intervention programme was found to be effective in improving the experimental groups' knowledge of the effects of hormonal contraceptives on nutrient utilization.

Based on the outcome evaluation involving the comparative analysis within and between groups, the observed changes in the knowledge of the experimental group could be attributed to the training programme implemented. The lack of significant change in

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knowledge of the control group is a further demonstration of the positive effects of the training programme only on the experimental group.

These findings sound a timely alarm. Accurate information should be provided about the nutritional implications of contraceptive use so an improvement in the safe use of contraceptives and reproductive health can be achieved.

5.8 Recommendations

1. The training intervention was effective in increasing the level of knowledge of women in the reproductive age on the effects of hormonal contraceptives on nutrient bio-availability in family planning clinics. It's recommended that the training be scaled up to include other family planning centers in the LGA.

2. For this study, the training intervention was carried out in tertiary health centers only. It's recommended that the training be scaled up to include other family planning centers of both primary and secondary tertiary health centers in the LGA and possibly other LGA's in Ibadan.

3. There is a need for massive public enlightenment in Ibadan North LGA using various intervention approaches owing to the low level awareness of the effects of hormonal contraceptives, which is an indication of the level of knowledge in the general population.

4. As indicated in the findings of this study, the hospital was the major source of information about family planning and nutrient utilization among the experimental and control groups. It is recommended that hospitals should be much more efficiently used to disseminate correct information and dispel misconceptions and be empowered to effectively carry out prevention and control activities on effects of hormonal contraceptives on nutrient utilization.

5. Based on the possibility that contraceptives may affect nutrition advantageously and disadvantageously, it is recommended that nutritionists be should be grafted into the family planning counseling unit to help educate contraceptive users.

5.9 Areas for Further Research

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Despite the limitations, this study has some strength which will contribute to the existing research literature on contraceptive use. This study assessed the knowledge of women on the nutritional side effects of contraceptive use and also involved the training of some of the women involved in the study. As no study on the knowledge of women on the nutritional side effects of contraceptives has been conducted to examine what women know, this study helps to fill a gap in literature. However a study is needed to explore and probe the factors affecting the knowledge of women on the nutritional side effects of hormonal contraceptives. This is necessary because recognizing these factors and dealing with them will help enhance the access of women to needed information and thereby leading to an increase in knowledge of the nutritional effects of hormonal contraceptives on nutrient utilization.

5.10 Limitations

This study examined only the use of hormonal contraceptives: oral contraceptives, Intrauterine device and the injectibles among women of the reproductive age. Limited only to these three types of contraceptives, results obtained can not be generalized to all contraceptives. Also only tertiary health facilities were considered and this limits the generalizabilty of the study to include primary and secondary health facilities.

Due to financial constraints the training was for one (1) day and as a result of attrition the impact evaluation of the training meant to be carried out during this study could not be carried out. Therefore the impact of the training could not be measured**.**

5.11 Contributions to Knowledge

1. It has added to literature.
2. More information about the safe use of contraceptives has been provided through this research.
3. This research has made obvious, the need for nutritionists to be part of the family planning counseling unit.

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Appendix II - Questionnaire

TITLE OF SURVEY – **EFFECT OF TRAINING ON KNOWLEDGE OF CONTRACEPTIVE USE AND ITS EFFECTS ON NUTRIENTS AMONG WOMEN IN IBADAN NORTH AND NORTH-EAST AREAS OF IBADAN**

QUESTIONNAIRE IDENTIFICATION NUMBER ----------

YEAR CONDUCTED - 2010

CITY _____

REGION/ LGA _____

SITE _____

AFRICA DIGITAL HEALTH REPOSITORY PROJECT

Introduction: "My name is _____. A masters student of the Department of Human Nutrition, Faculty of Public Health, College of medicine, University of Ibadan, Ibadan. I'm conducting a study titled "Effect of training on knowledge of contraceptive use and its effects on nutrients among women in Ibadan North and North East areas of Ibadan". The purpose of this study is to ascertain the knowledge of women in Ibadan North on the influence of contraceptives on nutrient metabolism and to advance the importance of counseling, nutritional supplements and the consumption of adequate diets seeing that the effects of contraceptives on vitamin and mineral status have received much less attention with more women being put at risk of nutrient deficiencies.

Confidentiality and Consent

Your responses and opinions will be kept confidential and will only be used for this study. No name is required in filling the questionnaire. Honest responses to the questions will be appreciated. You are free to ask questions for clarity and you are permitted to stop at any point in time. Circle or tick the option that best applies to you.

Date: _____ Signature: _____

Statement of person giving consent:

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SECTION A: SOCIODEMOGRAPHIC CHARACTERISTICS			
S/N	QUESTIONS	OPTIONS	CODE
1	Age	_____years	
4	Educational Qualification	1. No formal Education 2. Primary Education 3. Secondary Education 4. Secondary Education Completed 5. Others (Specify) _____	
3	Occupation	_____	
4	Religion	1. Christianity 2. Islam 3. Traditional 4. Others	

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		(Specify) _____	
5	Ethnic Group	1. Yoruba 2. Hausa 3. Igbo 4. Others	
6	Marital status	1. Single 2. Co-habiting (Living together) 3. Married 4. Divorced 5. Widowed	
7	Parity(Number of children)	_____	
8	Husband's Occupation/ Head of households occupation	_____	
9	Source of income	1. Partner 2. Other family member 3. Self employed 4. Job 5. Pension	
SECTION B: INFORMATION ON CONTRACEPTIVE USE			
10	Do you personally approve of using a family planning method for the purpose of spacing births?	1. Yes 2. No 3. I don't know	
11	Do you think that your spouse/partner approves or disapproves of couples using a method to avoid pregnancy?	1. Approves 2. Disapproves 3. Not currently married/has no partner 4. Don't know	
12	Who makes the decision whether or not to use family planning in your home?	1. Your husband/ your wife 2. You 3. Together	
13	What does the term family planning mean to you?	_____	
14	Mention the type of family planning you have heard of?	_____	
15	What method of contraception are you currently using?	1. Oral Contraceptives 2. Injectibles 3. IUCD 4. Condom 5. Withdrawal method 6. Others (Specify)_____	
16	For how long have you been using it?	_____Months/ years	
17	When was the first time you	1. Before the birth of the first child	

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	used this method?	2. After the birth of the first child 3. After the birth of the second child 4. Cant remember
18	Where did you get this method?	1. Hospital 2. Pharmacy 3. NGO 4. Others (Specify)_____
19	At the time you started using this contraceptive method, who advised you on how to use the method?	1. Nurse/ Midwife 2. Pharmacist 3. Partner 4. Relative 5. Friend 6. Other (specify)_____
20	Why did you choose this method?	1. Cost 2. Effectiveness 3. Safe 4. Recommended 5. Knows someone who uses it 6. Others (Specify)_____
21	Do you have any problems or concerns with your current method?	1. Yes 2. No 3. I don't know
22	If yes, what is the most important problem?	1. Cost 2. Side effects 3. Access/ availability 4. Not convenient 5. Less effective 6. Others (Specify)_____
23	Would you prefer to use another method?	1. Yes 2. No 3. I don't know
24	If yes what method?	1. IUD 2. Condom 3. Jelly 4. Female sterilization 5. Others (Specify)_____
25	Where do you get your contraceptive from?	1. Hospital 2. Pharmacy 3. NGO

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		4. Others (Specify)_____
26	Where you counseled on the side effects of contraceptives before you began using??	1. Yes 2. No 3. I don't know
27	Mention the side effects of any family planning method you know	_____ _____
28	For what purpose did you come to this health facility today?	1. Wanted FP information 2. Wanted new FP method 3. Wanted FP supplies 4. Wanted to stop method 5. Health concerns about current method 6. Ante-natal care 7. Others_____
29	Who do you talk to whenever you visit?	1. Doctor 2. Nurse 3. Health Assistant 4. Medical shop keeper 5. Other (specify)_____
30	How are you treated by the health worker?	1. In a friendly manner 2. Harshly 3. Others (Specify)_____
31	Are you usually given information on the side effects of contraceptives?	1. Yes 2. No 3. I don't know
32	Mention 2 contraceptives and their side effects	_____ _____
33	Since you've been coming here have you ever been counseled on the side effects of contraceptives on nutrients& on your nutritional status?	1. Yes 2. No 3. I don't know
SECTION C: COMPLAINTS OF WOMEN THAT HAS A NUTRITION LINK		
34	Have you had any health problems/ side effects that you think are related to using the contraceptive you're using?	1. Yes 2. No 3. I don't know
35	What kind of problem/ side	

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	effect was it?	Yes no 1. Headaches or dizziness 1 2 2. Blurred vision, seeing flashing lights 1 2 3. Weight gain 1 2 4. Nausea 1 2 5. Breast tenderness 1 2 6. Bleeding/spotting between menstrual periods 1 2 7. Mood changes (less interest in sex, depression). 1 2 8. Other (specify)_____ 1 2	
36	For how long did the experience last before changing the contraceptive?	_____	
37	Did you see a doctor for this (ese) problems?	1. Yes 2. No 3. I don't know	
38	Do you have or have or ever had any of the following medical conditions?	1. Blood clots 2. High blood pressure 3. Heart diseases 4. Abnormal pap smear 5. Problems with your liver 6. Gall Bladder disease 7. Diabetes 8. Aneamia 9. Colorectal cancer 10. Breast cancer 11. Cervical Dysplasia or cervical cancer 12. Depression 13. Sleeping Disorders 14. Weakness 15. Mascular pains 16. Poor wound healing	

SECTION D: KNOWLEDGE ABOUT THE EFFECTS OF CONTRACEPTIVE USE NUTRIENTS& THE NUTRITIONAL STATUS		
S/N	QUESTIONS	ANSWERS
39	Have you heard of the term	1. Yes

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	nutrients?	2. No 3. I don't know
40	What does the term nutrient means to you?	_____
41	List examples of the nutrients you know	_____
42	What are the benefits of - Carbohydrates - Protein - Fat - Vitamins - Minerals	_____ _____ _____ _____ _____ _____
43	List the Sources of the above mentioned nutrients.	_____ _____ _____ _____ _____ _____
44	Are there deficiencies associated with these nutrients?	1. Yes 2. No 3. I don't know
45	If yes , Mention for each of the nutrients mentioned above	_____ _____ _____ _____ _____
46	Have you heard of the term nutrient metabolism?	1. Yes 2. No 3. I don't know
47	What does the term mean?	_____
48	Do contraceptives affect nutrient metabolism?	1. Yes 2. No 3. I don't know
49	If yes, where did you get the information from?	1. Through media: television, radio, newspaper 2. Through a physician 3. Through friends 4. Through neighbors 5. Through relatives Others
50	Mention 4 of these side effects on nutrients	_____
51	What are nutritional supplements?	_____
52	What do nutritional supplements do/ Why are	_____

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	they taken?	
53	Do you use any nutritional supplement?	1. Yes 2. No
54	Do you think eating adequately can make up for these deficiencies?	1. Yes 2. No 3. I don't know
55	What food sources can make up for deficiencies resulting from contraceptive use?	_____

SECTION E: PERCEPTION OF WOMEN ON THE SOLUTIONS TO THE EFFECT OF CONTRACEPTIVES ON NUTRIENT METABOLISM

56. What solution(s) can you proffer to the effects of contraceptive use on nutrients?

SECTION F: ASSESSMENT OF NUTRITIONAL STATUS

Weight	
Height	
B MI	

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Appendix III – Sample of pre-and-post-training questionnaire

TITLE OF SURVEY – **EFFECT OF TRAINING ON KNOWLEDGE OF CONTRACEPTIVE USE AND ITS EFFECTS ON NUTRIENTS AMONG WOMEN OF THE REPRODUCTIVE AGE IN IBADAN NORTH**

PRE-TEST QUESTIONNAIRE

Questionnaire Identification Number _____ Phone Number _____

City_____ Site_____

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1. What is Family planning?
2. Mention the types of family planning you know?

2b. Sources of information on family planning'

3. Mention 4 side effects of contraceptives.
4. Nutrients are constituents in food needed by the body. TRUE/FALSE.
5. Mention the type of nutrients you have heard of.
6. Do contraceptives affect nutrients? YES/ NO
7. Mention some nutrients affected by contraceptives
8. Why are nutritional supplements important for those using contraceptives?
9. Eating adequately is very important as you use contraceptives. TRUE/FALSE
10. Nutritional counseling as part of family counseling on contraceptives is vital. TRUE/ FALSE

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Appendix IV- Knowledge scale

Knowledge Scale

The knowledge questions composed of three sections. A score of 5 was assigned for each correct answer and 0 for incorrect responses.

Knowledge scores for Contraceptives and side effects:

Total score for the 9 questions asked= 45

Good knowledge = 23- 45

Poor knowledge = <23

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Knowledge scores for nutrients:

Total score for the 5 questions asked= 25

Good knowledge = 13- 25

Poor knowledge = <13

Knowledge scores for the effects of nutritional side effects of contraceptive use:

Total score for the 5 questions asked= 25

Good knowledge = 13- 25

Poor knowledge = <13

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Appendix V- Training Manual

EFFECT OF TRAINING ON KNOWLEDGE OF CONTRACEPTIVE USE AND ITS EFFECTS ON NUTRIENTS AMONG WOMEN IN IBADAN NORTH AND NORTH-EAST AREAS OF IBADAN

Goal

The goal of this training programme is to increase the knowledge of contraceptive users on the nutritional effects of contraceptives especially its effects on nutrient metabolism.

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Training Objectives

1. At the end of this training, the study participants should be able to say what family planning is.
2. At the end of this training, the study participants should be able to mention 4 types of contraceptives.
3. At the end of this training, the study participants should be able to mention 4 side effects of contraceptive use.
4. At the end of this training, the study participants should be able to say what nutrients are.
5. At the end of this training, the study participants should be able to mention 4 nutrients needed by the body.
6. At the end of this training, the study participants should be able to tell if nutrients are affected by the use of contraceptives.
7. At the end of this training, the study participants should be able to mention 5 nutrients affected by the use of contraceptives.
8. At the end of the training the study participants should be able to decide if eating adequately is important for individuals that use contraceptives.
9. At the end of the training the study participants should be able to mention the importance of nutritional supplements for individuals that use contraceptives.
10. At the end of this training, the study participants should be able to decide if nutritional counseling is important as regarding contraception and its side effects.

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Components of this training programme

S/N	OBJECTIVES	CONTENTS	METHOD OF TRAINING	RESOURCES	EVALUATION
1	At the end of this training, the study participants should be able to say what family planning is.	Definition of family planning	1. Lectures 2. Songs 3. Brain storming 4. Verbal communication 5. Pictures 6. Discussion	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers

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			7. Reflection		
2	At the end of this training, the study participants should be able to mention 3 types of contraceptives.	Types of contraceptives -IUCD -Pills -Injectibles	1. Lectures 2. Songs 3. Brain storming 4. Verbal communication 5. Pictures 6. Discussion Reflection	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers
3	At the end of this training, the study participants should be able to mention 3 side effects of contraceptive use.	Side effects of contraceptive	1. Lectures 2. Songs 3. Brain storming 4. Verbal communication 5. Pictures 6. Discussion Reflection	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers
4	At the end of this training, the study participants should be able to mention 3 nutrients needed by the body.	Types of essential nutrients	1. Verbal communication 2. Pictures	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers.
5	At the end of this training, the study participants should be able	Nutrients affected by contraceptive	1. Verbal communication 2. Pictures	1. Course materials will be printed out 2. Markers 3. Cardboard	Questions & answers

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	to mention 3 nutrients affected by the use of contraceptives.	-Carbohydrate -Protein -Fat -Vitamins		4. Charts	
6	At the end of the training the study participants should be able to decide if eating adequately is important for those taking contraceptives.	1. True 2. False 3. I don't know	1. Verbal communication 2. Pictures	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers
7	At the end of the training the study participants should be able to mention the importance of nutritional supplements for those taking contraceptives.	For the supplementation of lost nutrients and blood.	1. Verbal communication 2. Pictures	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers
8	At the end of this training, the study participants should be able to decide if nutritional counseling is important as regarding contraception	1. Yes 2. No 3. I don't know	1. Verbal communication 2. Pictures	1. Course materials will be printed out 2. Markers 3. Cardboard 4. Charts	Questions & answers

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	and its side effects.				

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Appendix VI- Training intervention timetable

TIME	TOPIC	SPEAKER

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9- 9:30am	Arrival& Opening Prayer	Participant
9:30- 9:50am	Introduction, Welcome and opening	Mrs Owoade omolara
9:50- 10:20am	Pre-test	Olukomogbon Temitope/ Jane Inyang
10:20- 11:05am	Talk on Family planning	Ogunsanya Oluwatosin/ Olukomogbon Temitope
11:05- 11:25am	Group activity	Bimbo Adebisi/ Opedola Obisesan
11:25- 12:10am	Talk on Nutrients& Effects of Contraceptives on Nutrients	Mrs Owoade Omolara/ Olukomogbon Temitope
12:10- 12:30am	Group activity	Bimbo Adebisi/ Opedola Obisesan
12:30-1:00pm	Post-test	Olukomogbon Temitope/ Jane Inyang
1.00-1:30pm	Training Evaluation	Olukomogbon Temitope
1:30-1:50pm	Closing remarks/ Vote of thanks	Mrs Owoade Omolara
1.50- 2:2-pm	**LUNCH BREAK & DEPARTURE**	

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Appendix VII - A cross-section of trainees during the pre-training

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Appendix VIII - A cross-section of trainees during the training

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Appendix IX - A cross-section of trainees during the training

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Appendix X - A cross-section of trainees during the post-training

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