

**CHOICE AND FACTORS ASSOCIATED WITH
CONTRACEPTIVE USE AMONG WOMEN AGED 40 YEARS OR
MORE AT MOI TEACHING AND REFERRAL HOSPITAL,
ELDORET - KENYA.**

BY

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**THIS THESIS IS SUBMITTED TO THE SCHOOL OF MEDICINE,
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AN AWARD OF THE DEGREE MASTER OF MEDICINE IN
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DECLARATION

Declaration by the student

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DEDICATION

To my parents Christine and Joel Chesire for their good advice, prayers and constant support throughout my academic journey

To all perimenopausal women without whom this study would not be possible.

I would also like to dedicate this work to my loving husband, Joshua, Sombe our daughter, my family, and colleagues who have continued to support and encourage me to excel in life.

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Finally, I want to thank my entire family and above all acknowledge Jehovah for His strength throughout this study.

LIST OF ABBREVIATIONS AND ACRONYMS IN THIS STUDY

AMA	Advanced Maternal Age
AMPATH	Academic Model Providing Access to Healthcare
AOR	Adjusted Odds Ratio
BMD	Bone Mineral Density
BP	Blood Pressure
BTL	Bilateral Tubal Ligation
CHC	Combined Hormonal Contraception
CI	Confidence Interval
COCS	Combined Oral Contraception
COR	Crudes Odds Ratio
CSA	Central Statistical Agency
DHS	Demographic Health Survey
DMPA	Depot Medroxyprogesterone Acetate
EDHS	Ethiopia Health Demographic Survey
E-PILL	Emergency pill
FP	Family Planning
FSH	Follicle Stimulating Hormone
FSRH	Faculty of Sexual and Reproductive Health
HELLP	Haemolysis Elevated Liver enzymes Low Platelets
HMB	Heavy Menstrual bleeding
HPV	Human Papilloma Virus
HRT	Hormone Replacement Therapy
IUCD	Intrauterine Copper Devices
IREC	Institution of Research and Ethics Committee
KDHS	Kenya Demographic and Health Survey

LAM	Lactation Amenorrhoea
LARC	Long-Acting Reversible Contraception
LNG IUD	Levonorgestrel Intrauterine Device
LNG IUS	Levonorgestrel Intrauterine System
MEC	Medical Eligibility Criteria
MI	Myocardial Infarction
MTRH	Moi Teaching and Referral Hospital
NDHS	Nigeria Demographic Health Survey
OR	Odds Ratio
POP	Progestin Only Contraception
RR	Risk Ratio
STI	Sexually Transmitted Infection
TDHS	Turkey Health Demographic Survey
UK	United Kingdom
UBOS	Uganda Bureau of Statistics
USA	United States of America
VTE	Venous Thromboembolism
WHO	World Health Organization
ZDHS	Zimbabwe Health Demographic Survey

OPERATIONAL DEFINITION OF TERMS

The older woman in this study will be women 40 years and above of age.

KEY DEFINITION OF TERMS

Advanced maternal age: pregnancy occurring in women at age 35 years or older.

Contraception: measures that prevent the occurrence of a pregnancy. There are permanent and temporary methods, also traditional and modern contraceptives.

Family planning: the practice of controlling the number of children one has and the intervals between their births by using contraception.

Fecundity: refers to the probability of a woman having a live birth for any given month.

Infecund: Women who have a low risk or no risk of becoming pregnant such as those who have had a hysterectomy.

Modern contraception methods: Contraception methods introduced in Kenya based on innovations in reproductive health such as female and male sterilization, pills, patches, intrauterine devices, injectables, implants, female and male condoms and emergency contraception.

Traditional contraception methods: include rhythm, withdrawal, periodic abstinence, and post-coital douching.

Long-acting reversible contraception methods (LARC): a group of contraceptives that are highly effective for an extended period. They include progestin-only injections, implants and intrauterine devices.

Unmet need for family planning: Women of reproductive age who are not using contraception but wish to postpone their next birth (spacing) or stop childbearing altogether (limiting).

Menopause: The time that follows one year after cessation of menses. Age at menopause is between 45 to 55 years.

Perimenopause/menopausal transition is the time just before and after menopause until there have been no menses for 12 months. It begins on average, four years before the final menstrual period. The hallmarks are irregular menstrual cycles, marked hormonal fluctuations, hot flashes, sleep disturbances and mood disturbances.

Postmenopausal: The phase of life after menopause.

Reproductive age: women aged 15-49 years.

ABSTRACT

Background: Women aged over 40 years old are perimenopausal which is a transition phase marked with symptoms due to hormonal fluctuations, signaling the end of fertility. Though fertility is reduced, pregnancy can occur associated with adverse maternal-fetal outcomes than the younger women. Pregnancies are further complicated by comorbidities such as cardiovascular disease and malignancies prevalent in these women. Therefore, effective contraceptive is necessary until menopause to avert unintended pregnancies. They have unmet need for contraception and this study will assess the factors affecting their contraceptive use.

Objective: To determine the proportion of contraception use, choice, as well as factors influencing contraception utilization among women aged forty years or more at Moi Teaching and Referral Hospital (MTRH).

Methods: A cross-sectional study among 359 women aged 40-55 years attending specialist outpatient clinics at MTRH from January to December 2020. The outpatient clinics were stratified into 5 major clinical departments (Internal Medicine, Surgery, Obstetrics and Gynecology, General Oncology and Psychiatry) and proportionate sample allocated for each clinic. Systematic sampling was used to select every tenth eligible woman while interviewer administered questionnaire was used to collect sociodemographic, clinical and reproductive history as well as contraception use and choice. Descriptive statistical techniques were used to describe the study participants, while Pearson Chi Square and Fisher's exact tests were used to test the association between predictor variables and contraceptive use. Logistic regression was used to control for confounders and adjusted odds ratios computed at 95% confidence interval.

Results: The mean age of the study participants was 44.8 (± 3.7) years. Majority were aged between 40 to 44 years, 339 (94.4%) had a minimum of primary level of education and 352 (98.1%) had given birth before. The overall proportion of contraception use was 44.6% (n=160), with almost equal proportions 73 (45.6%) using modern hormonal and 75 (46.9%) on non-hormonal contraception methods. The most used contraceptives were Depot Medroxy Progesterone Acetate (DMPA) at 37 (23.1%) and bilateral tubal ligation at 36 (22.5%). Women aged 40-44 years were more likely (AOR=1.243; 95% CI: 0.900, 1.718) to use contraception compared to those aged 45-49 years and nearly twice as likely (AOR= 1.767; 0.846, 3.689) as those aged fifty years or more. Being multiparous (p=0.003) and married (p=0.005) were significantly associated with contraceptive use. Being Catholic (p=0.013), desiring to conceive (p=0.003) and having premenopausal symptoms (p<0.001) were significant barriers to contraception. About half (51%) of participants who did not use any form of contraception cited health concerns. Hypertensive (p=0.013) and those with cardiac disease (p=0.008) significantly used non-hormonal contraceptives.

Conclusion: Less than half (44.6%) of women aged 40 years or more used contraception. Majority of them opted for DMPA and bilateral tubal ligation. Being 40-44 years, married and multiparous were significantly associated with contraceptive use. Significant barriers to contraception were being catholic, desiring to conceive and having premenopausal symptoms. Women with heart disease and hypertension significantly used modern non-hormonal contraceptives.

Recommendations: There is need to improve uptake of contraceptives by women older than 40 years by addressing barriers to contraception; and counselling those with health-related barriers to the availability of safe contraceptives. Integration of contraception services during patient visits at the outpatient clinics or referral to family planning clinics to improve uptake. A community study using mixed methods can further explore factors affecting contraceptive utilization among these women.

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CHAPTER ONE

1.0 INTRODUCTION

1.1 Background

Contraception is the deliberate prevention of occurrence of a pregnancy by use of modern or traditional methods. Modern contraceptive methods can be further sub-classified either as hormonal or non-hormonal (Aksu, 2016). The use of contraception until menopause allows women to properly plan for optimal family size. Contraceptive needs for women at different reproductive ages vary, with the ideal method changing over time (Baldwin & Jensen, 2013).

Perimenopausal period is the transition phase from normal ovulation to permanent cessation of ovarian function, beginning around 40 years of age and lasts about two to eight years (Kelsey, 2012). Perimenopause is characterized by irregular menses, anovulatory cycles and later followed by twelve months of amenorrhea (Baldwin & Jensen, 2013; Miller et al., 2018). Other common perimenopausal symptoms include, mood instability, hot flashes, vaginal dryness and insomnia (Speroff & Fritz, 2005).

Due to a decrease in ovarian function and quality of oocytes in women over 40 years, fertility reduces but does not disappear. Women can still spontaneously conceive even in their 50s (Aksu, 2016). The fertility rate of women aged 40-44 years is 8.4 births per 1000 women declining to 0.2 per 1000 women in those aged 45 years or more. Therefore effective contraception is required until menopause to prevent unintended pregnancies (Allen et al., 2013).

There has been an increase in the uptake of contraceptives worldwide over the past 50 years, however, this uptake has been lowest in Sub Saharan Africa (United Nations, 2015). Globally, the overall contraceptive use among women of reproductive age (15-49 years) is at 48.5%. In the developed countries, there is higher contraceptive uptake

among women of reproductive age with prevalence in Europe at 58.2%, Latin America at 58%, while Sub Saharan Africa has the lowest utilization rates at 28.5% (United Nations, 2019). In Kenya, the proportion of modern contraception use among married women of reproductive age increased from 32% in 2008 to 58% in 2014 (KDHS, 2014).

In the developed countries such as the United States of America (USA), 73.7% of women age 40–49 years in 2015-2017 were using a contraception method (Daniels & Abma, 2020). In contrast, the contraceptive prevalence in Kenya is at 43.4% between ages 40-44 years and 31% in those aged 45-49 years (KDHS, 2014). Uganda reported similar findings of contraceptive use at 38.9% in women aged 40-44 years and 23.3% in those 45-49 years (UBOS, 2017).

Women aged 40 or more are in different situations regarding their fertility. Some have achieved the desired family size, others have no children, and yet still, others have just began child bearing (Godfrey et al., 2011; Miller et al., 2018). In addition there is an increasing number of women globally, deferring childbearing to later reproductive years in pursuit of financial security, which raises the age at first birth or marriage (Ventura et al., 2008). Despite the deferment, many pregnancies in older women are unintended, either mistimed or unwanted occasioned by unmet need for contraception (Gilda et al., 2007). In the United States of America (USA), 48% of pregnancies in women aged 40 years or more were unintended (Finer & Zolna, 2011) while in Kenya, 20% of pregnancies in women aged 40 to 44 years were unintended (KDHS, 2014).

Further, the resulting pregnancies in advanced maternal age are at higher risk of adverse fetal and maternal outcomes (Aksu, 2016). Age is an independent risk factor for both chromosomal and non-chromosomal fetal anomalies as found by a Danish

study where pregnant women aged 40 years or older had 44% risk of chromosomal abnormality as compared to those aged 20-34 years (Frederiksen et al., 2018). The odds of chromosomal anomalies such as trisomy 21 and 18 increase by 1.160 times as the maternal age increases by a year (Kim et al., 2013). Other adverse pregnancy outcomes include caesarian section, postpartum hemorrhage, gestational diabetes mellitus and gestational hypertension, placenta previa and fetal malpresentation. The risk of maternal mortality in these women increases fivefold compared to women in their 20s' (Callaghan & Berg, 2003; Kelsey, 2012). The risk of abortion is higher (50%) in those aged 45 years or more compared to 10-20% in those below 39 years (Jolly et al., 2000). Therefore it is vital to discuss the risks of pregnancy with older women and especially those with medical co-morbidities (Baldwin & Jensen, 2013).

On choice of contraception, none is contraindicated based on age alone (Aksu, 2016; Baldwin & Jensen, 2013). There are several safe and effective methods for women over 40 years, which also offer non contraceptive benefits, however, pre-existing medical conditions such as stroke can restrict the use of some methods (Curtis et al., 2016; World Health Organisation, 2015). The suitable choice for an individual woman should be based on a complete history and physical examination by the health provider (Linton et al., 2016).

Although older women desire permanent methods such as sterilization than younger women (KDHS, 2014; Lader, 2009) the use of reversible hormonal methods, withdrawal, and rhythm has increased lately (Adetunji, 2011; Şahin & Kharbouch, 2007). Copper intrauterine device and progestin-only implants are safe in women over 40 years with very few contraindications. Combined hormonal contraceptives can be used in older women who do not have cardiovascular risks such as hypertension,

obesity, smoking until menopause then transition to hormonal replacement therapy (Miller et al., 2018; World Health Organisation, 2015).

A number of studies have shown that non-contraceptive benefits unique to perimenopausal women include reducing the risk of sexually transmitted diseases, gynecologic cancers, alleviating perimenopausal symptoms such as hot flashes and regularizing menstrual periods (Juan Enrique Blümel & Vallejo, 2020; Hardman & Gebbie, 2014; Linton et al., 2016). Knowledge of this benefits by the older women and the healthcare providers can improve contraceptive utilization (Bakour et al., 2017; Miller et al., 2018).

Factors that influence contraception use by women over 40, differ from those of the younger population but have not been widely studied or understood (Elias & Sherris, 2003). Older women are more concerned about medical comorbidities, changing partnership status and the perception of low risk of pregnancy occurrence (Godfrey et al., 2011). Factors such as loss of libido resulting from effects of hormonal changes, family stress or insomnia may make older women perceive that there are at a lower risk of getting pregnant. Additionally, having multiple unprotected sexual intercourse without conceiving inherently influences contraceptive use (Linton et al., 2016; OlaOlorun, 2013). The age-related increased risk of cardiovascular disease, gynecological and breast malignancies, irregular menses can also affect the choice and use of contraceptives (Baldwin & Jensen, 2013; Hardman & Gebbie, 2014).

The timing for stopping contraceptive use varies with age and type of contraception. Generally, women can stop using contraceptives at age 55 as the risk of spontaneous conception is extremely rare even in those with menses (FSRH, 2017). Women below 50 years old, on non-hormonal contraceptives can stop using the method after 2 years of amenorrhea. Those aged 50 years or more can stop after 1 year of amenorrhea.

Women at or over 50 years old who are on combined hormonal contraceptives or progestin injectables are advised to switch to non-hormonal contraceptives and continue until after one year of amenorrhea. This is because of increased risk of thromboembolism after age 50 years (Allen et al., 2013; FSRH, 2017).

This study will analyze the contraception use, choices and the factors affecting contraceptive utilization in this special group of women at Moi Teaching and Referral Hospital in Western Kenya.

1.2 Problem Statement

Anecdotal data indicates low contraceptive prevalence in low income countries worse of in perimenopausal women. This creates a huge group of women with unmet contraceptive need despite additional non-contraceptive benefits such as alleviation of perimenopausal symptoms, reduced risk of gynecological malignancies and sexually transmitted diseases.

Most documented studies on contraception have examined individual, institution, and community determinants of contraceptive use among women of reproductive age. There are limited studies published globally on the contraception practices and needs among women aged 40 years and more, so as to provide the basis of the underlying factors behind their contraceptive non-use.

1.3 Justification

This study looked at women aged 40 years and above because they are perimenopausal (transitioning to menopause) and experience a myriad of reproductive health challenges and are at risk of developing adverse medical conditions such as cardiovascular diseases. Despite their decline in fertility, there is a likelihood of unplanned conception among those who are still sexually active, and this necessitates adoption of effective contraception methods until menopause. Unintended

pregnancies although disruptive to women irrespective of age, are more detrimental in older women who have higher rates of adverse maternal and fetal outcomes because of their advanced age and comorbidities associated with age such as hypertension and diabetes. Maternal complications include increased rates of gestational diabetes, pregnancy induced hypertension, mortality and caesarian section. Fetal and neonatal complications are such as chromosomal abnormalities, abortion and prematurity. Therefore, there is need for an increased adoption of contraception among sexually active perimenopausal women in Kenya to enable them get both the reproductive health and clinical benefits associated with contraceptives use.

Although extensive studies have been conducted globally examining contraception concerns among younger women of reproductive age; a better understanding of the underlying issues affecting contraception use by perimenopausal women will inform both healthcare practitioners and policy makers on how to address contraception concerns. Furthermore, studies have indicated that in countries with developing economies, reproductive health needs among older women receive less attention necessitating local studies to provide a contextual basis of the problem. This study will address this limitation by examining a wide range of factors influencing contraceptive utilization. The findings will inform on better contraception utilization approaches among perimenopausal women.

Moi Teaching and Referral Hospital (MTRH) was selected as a study site because it is the 2nd largest national referral hospital in Kenya that providing a wide variety of specialized services to clients, including contraception. No such study has been conducted in the facility. MTRH has more than 30 consultant outpatient clinics from where we drew our sample. These patients came from various communities and have a myriad of age-related illness including malignancies and cardiovascular diseases

such as hypertension, diabetes mellitus and heart disease. The effect of these disease conditions on contraception will be looked at in this study as they significantly impact maternal fetal morbidity and mortality.

1.4 Research Questions

1. What is the proportion of women aged 40 years or more using contraception at MTRH?
2. What are the contraceptive methods used by women aged 40 years or more at MTRH?
3. What are the socio demographic, reproductive and clinical factors affecting contraceptive use in women aged 40 years and above at MTRH?

1.5 Objectives

1.5.1 Broad Objective

To describe the choice and factors associated with contraceptives use in women aged 40 years or more at MTRH.

1.5.2 Specific Objectives

1. To determine the proportion of women aged 40 years and above old using contraception at MTRH.
2. To describe the contraception methods used by women aged 40 years and above MTRH.
3. To describe the socio demographic, reproductive and clinical factors influencing contraception use in women aged 40 years and above at MTRH.

CHAPTER TWO

2.0 LITERATURE REVIEW

2.1 Introduction

Contraception is an essential demographic factor in many countries. It is beneficial for women and their families to control fertility by promoting healthy spacing and intervals of pregnancies (Allen et al., 2013). Continuing contraception during late reproductive years will help women achieve their desired family size by avoiding mistimed pregnancies (Baldwin & Jensen, 2013).

Therefore, this section will describe the findings of other researchers on the contraceptive prevalence, the type of contraceptives used and the factors affecting utilization of contraception. It will also demonstrate similarities and differences between previous studies on the subject.

2.2 Prevalence of contraceptive use in women aged 40 years old or more.

According to United Nation's department of economics and social affairs, 48.5% of women in the reproductive age globally are on contraception, with the majority (44%) being on modern methods and 4% on traditional methods (United Nations, 2019). With regards to the specific methods, bilateral tubal ligation (BTL) is the most commonly used method at 24%, followed by condoms (21%) and intrauterine devices (17%) pills (16%). Implants and vasectomy are the least commonly used at 2 % each. The use condoms rose from 64 million to 189 million from 2015 to 2019. The use of implants is highest in Sub Saharan Africa at 14.9% (United Nations, 2019).

In Asia and Latin America, permanent or long acting methods are most prevalent. In specific, female and male sterilization lies at 21.8% and 16% respectively. Short acting methods are used more in Sub Saharan Africa. Generally, Sub Saharan Africa is lagging behind with a contraceptive prevalence of 28.5% whereas developed

countries such as Europe and North America have higher uptakes of 58.2%. Southern Africa has a rate of 49.7% while Eastern Africa has a prevalence of 32.5%. Rwanda's prevalence in 2014 is 32.3% while Kenya's is 45.2% (United Nations, 2019).

In Sub Saharan Africa, injectable contraception methods are the most commonly utilized at 9.6%. In Congo and Cameroon, rhythm method is most prevalent at 9.5% and 9.1% respectively. In Congo, Albania and Somalia, traditional methods account for more than half of contraceptives used (United Nations, 2019) .

In countries with better economies such a United States of America, 74.8% of women aged between 40-49 years used contraception. This was according to the data from National Survey of Family Growth between 2017 and 2019. Bilateral tubal ligation was the most used contraception at 39.1% (Daniels & Abma, 2020).

In a national survey on contraception use among Canadian women of reproductive age that had 5597 participants, the prevalence of contraceptive use of women aged 40 to 49 years was 40.3% with condoms and oral pills accounting for 42.5 and 17.1% respectively (Black et al., 2009).

In the UK, the utilization of contraception among women in the ages of 40 to 44 years was 75% with 28% undergoing vasectomy, 18% had bilateral tubal ligation done and 21% used male condoms (Lader, 2009). According to Nigeria demographic health survey 2018, the contraception utilization among women between 40 and 44 years was very low, at 19.8% with implants and injectables being the most common at 4.1% and 3.5% respectively (NDHS, 2019). According to Zimbabwe demographic health survey 2015, 57.4% of women aged 40 to 44 years used contraception, with oral pills being the most used at 28.3% and the least being rhythm method at 0.1% (ZDHS, 2016). Ugandan demographic health survey 2016 had an overall contraception rate of

38.9% with injectables and implants being most utilized at 13.3 and 5.7% respectively (UBOS, 2017). The Kenyan demographic survey on women of the same age group had an uptake rate of 48.4% with injectables and implants being most utilized at 15.3% and 5.8% respectively (KDHS, 2014).

In studies on women aged between 45 and 49 years, the prevalence ranges from 11.7 to 72%. In the United Kingdom national survey, 72% of women in this age group used contraception, with male and female sterilization being preferred at 30% and 19% respectively. Traditional methods used included rhythm (5%) and withdrawal (4%) (Lader, 2009). Despite Nigeria having the highest population in Africa with a very high unmet need for contraception (Solanke, 2017), the contraception use was low at 11.7% with female sterilization being used by 8.4% (NDHS, 2019). In Zimbabwe it was 43.1% with oral pills and male condoms being used by 18.9% and 8.9% respectively (ZDHS, 2016). Uganda had lower contraceptive use rate of 23.3% with injectables and female sterilization accounting for 6.4 and 6.1% respectively. The Kenyan statistics show a prevalence of 37.3% with female sterilization and injectables being most commonly used at 9.5% and 9.4% respectively (KDHS, 2014). The total demand for family planning in Kenya is highest in women aged 35-39 years and lowest in extreme ages, those between 45-49 years and the teenagers (KDHS, 2014).

Sahin et al., in a Turkish cross-sectional study on 202 perimenopausal women aged between 45 to 59 years old with a mean of 51 years, the most commonly used method was withdrawal at 38.8%, followed by intrauterine copper device (IUCD) at 24.3%. 80.2 % had no idea when to stop contraception use. Other traditional methods such as vaginal lavage and vaginal aspirin accounted for 18% (Şahin & Kharbouch, 2007) . According to data from Turkey's primary health survey in 2013, 49.7% of women

aged 40-44 years used modern contraception, which decreased to 31.8% for those 45-49 years old. The popular methods were IUDs (18.2%), tubal ligation (16.7%), and condoms (10.5%) (TDHS, 2014).

Very few studies have been done on contraception use among women older than 50 years old. Ama and Olaomi, in their study in Botswana, on 444 women aged 50 years and above selected from 4 districts (2 urban, 2 rural), established a contraceptive prevalence of 25.2%. Fifty five (55%) used abstinence, while 41% used condoms (Ama & Olaomi, 2019).

2.3 The contraception methods used by women aged 40 years and above.

The World Health Organization medical eligibility criteria for the choice of contraceptives in women 40 years and above indicate that there is no restriction for using any contraception method (category 1). DMPA use in women over 45 years is category 2, meaning the benefits still outweigh the risks (World Health Organisation, 2015). Appendix VII illustrates the medical eligibility criteria by World Health Organization for use of various contraceptives in women aged 40 years or more.

Various contraceptive options may be offered to women over 40, including oral contraceptives, tubal ligation, intrauterine devices, barrier methods, hormonal injectables, and implants. Newer forms of combined hormonal contraception are available, and they have fewer side effects but are highly efficacious. Examples are monthly injectables, the vaginal ring, and the transdermal patch (Aksu, 2016; Curtis et al., 2016)

The choice of contraception is affected by non-contraceptive factors such as medical conditions, frequency of coitus, treatment of hot flushes and menstrual irregularity, prevention of sexually transmitted infection, decreased fertility and osteoporosis

(Bakour et al., 2017; Miller et al., 2018). The various contraceptive choice by women over 40 years are discussed below:

2.3.1 Combined hormonal Contraceptives

Combined hormonal contraceptives include combined oral pills, transdermal patches and vaginal rings (Bakour et al., 2017; Cho, 2018).

There is regional variation of the utilization of combined oral pills, with high prevalence in Zimbabwe, Canada and the United Kingdom (28.3%, 17% and 10% respectively) in women aged 40 to 44 years (Black et al., 2009; ZDHS, 2016; Lader, 2009)). Some countries such as Ethiopia have completely shunned their use, as reported by the 2014 demographic survey which had zero use in women aged 45 to 49 years (CSA, 2014).

Perimenopausal women usually have heavy, irregular or light menstrual periods that can be treated with combined oral contraceptives (COCs), thereby resulting in regular cycles (Duckitt, 2010). COCs can also be used to treat secondary dysmenorrhea in women over 40 with endometriosis (Harada et al., 2008).

Vasomotor systems such as hot flashes and nocturnal sweating are perimenopausal symptoms which can be effectively treated using COCs (Allen et al., 2013; Baldwin & Jensen, 2013). Extended or continuous COCs provide better relief of vasomotor symptoms as shown by Blumel and colleagues. In their randomized control trial, they demonstrated that addition of 5 days of estrogen during the 7 pill free days of the normal 28 pack COCs resulted in better control of vasomotor symptoms (J. E. Blümel et al., 2001). Sexual dysfunction and mood disorders such depression and anxiety can be improved by use of COCs (Blümel et al., 2001).

Women more than 40 years old have bone mineral density (BMD) loss of 1% per year. COCs are advantageous in maintaining BMD (Gambacciani et al., 2004). The use of COCs in women aged 40 years and above reduced the risk of hip fractures by 25% (Michaëlsson et al., 1999).

Older women have an increased risk of gynecological malignancies such as endometrial and ovarian cancers. In a cohort study by Cibula on effect of hormonal contraception and risk of cancer, it was shown that COCs were significantly protective against ovarian and endometrial cancer. The relative risk for ovarian cancer reduces by 20% for every 5 years of use of COCs while there is a 50% risk reduction for endometrial cancer for those who have ever used COCs. Protective benefits accrue with increased duration of use (Cibula et al., 2010). The non-contraceptive benefits of combined hormonal contraceptives and other contraceptives are summarized in appendix X.

However, the use of COCs is associated with risks which can be grouped into cardiovascular and oncological (Kelsey, 2012). Advanced age is in itself a risk factor for cardiovascular disease and the use of COCS is an added risk (Cho, 2018). Women older than 40 years without cardiovascular risks such as hypertension, diabetes mellitus, cigarette smoking and obesity can safely use COCs until age 50, after which they should be switched to a non-hormonal or progestin only contraceptives. Those with cardiovascular risks should be offered alternative contraception options (FSRH, 2017).

The cardiovascular risks associated with COCS include venous thromboembolism(VTE), myocardial infarction (MI), hypertension and stroke (Kelsey, 2012). In the 1960s and 1970s, there was a rise in cardiac events such as MI

due to the high estrogen content of COCs, which prompted the current regimen that has reduced estrogen. The risks of cardiac events has subsequently reduced (Shufelt & Bairey Merz, 2009).

Venous Thromboembolism increases with age, more so after 50 years. With use of COCs, VTE risk increases threefold. In a meta-analysis of 6476 citations on risk of acute thromboembolic events with COCs, there was a threefold increase in risk of VTE and a twofold increase of ischemic strokes among current users (Peragallo Urrutia et al., 2013).

Use of COCs increases the risk of cancer of the cervix as demonstrated by meta-analysis of 24 worldwide studies on association between cervical cancer and use of COCS where 16,573 patients with cancer of the cervix were compared with 35,509 participants without cancer of the cervix. There was an increased risk (1.90(95%CI 1.69 – 2.13) of cancer of the cervix when the duration of COC use of 5 or more years when compared with nonusers. The risk reduced with stoppage of COCs reaching the level of nonusers after 10 years (Collaboration et al., 2009)

Age increases the risk of breast cancer and combined hormonal contraceptives (CHCs) are contraindicated in active cancer due to the risk of VTE. According to the findings of a large cohort study done over 36 years by the Oxford Family planning association, COCs did not increase the risk of developing breast cancer (Vessey & Painter, 2006).

Appendix IX will illustrate the medical eligibility criteria by world health organization for use of combined hormonal contraceptives by the specific medical conditions.

2.3.2 Progestin only contraceptives

They include injectables, implants, pills and intrauterine progesterone devices. The injectables are depot medroxyprogesterone acetate (DMPA) and norethisterone enanthate (NET-EN). DMPA can be given intramuscularly (DMPA-IM) 150mg three-monthly or subcutaneously (DMPA-SC) 104 mg every two months. NET-EN is given two monthly and dosage is 200mg intramuscularly. Both the subcutaneous and intramuscular formulations have the same safety and therapeutic profile. The currently used progestin-only implants containing levonorgestrel are Jadelle and Sino-plant. Implanon contain etonorgestrol (World Health Organisation, 2015)

In the western world, progestin only contraceptives are not popular. In Canada, only 1% of women aged 40 to 49 years used DMPA with none using implants (Black et al., 2009). In the UK, only 1% and 4% of women aged 45 to 49 years used implants and DMPA respectively (Lader, 2009).

Globally, Sub-Saharan Africa has the highest utility of injectables (9.6%) and implants (14.9%) (United Nations, 2019). Data from 6 demographic health surveys in Sub-Saharan Africa revealed a rising popularity of injectable contraceptives. Some of the reasons behind this rise include convenience, secrecy, long duration of action unlike pills which have to be taken daily, low failure rates of 4% in typical use and 0.2% in perfect use (Adetunji, 2011; World Health Organisation, 2015). In addition, they cause amenorrhoea which reduces blood loss and reduces crisis in chronic diseases such as sickle cell disease (Adetunji, 2011; Sullivan et al., 2006).

Sub Saharan countries have embraced the use of progestin contraceptives. DMPA is the most commonly used contraceptive in women over 40 years in Eastern Africa. According to DHS of women aged 40 to 44 years, the prevalence of DMPA use in

Ethiopia, Kenya and Uganda was 16.8%, 15.3% and 13.3% respectively (EDHS, 2017; KDHS, 2014; UBOS, 2017). In West African countries such as Nigeria which has a low contraceptive uptake (19.8%), DMPA was the 2nd most commonly used method at 3.5% in women aged 40 to 44 years (NDHS, 2019). Levonorgestrol intrauterine system is not mentioned by demographic health surveys but Lader et al, in the UK found 3% of use among women 40-44 years old (Lader, 2009).

Implants were the 2nd most commonly used contraceptives in Ethiopia with uptake rates of 6.6% and 4.2% among women aged 40-44 years and 45 -49 respectively(EDHS, 2017). They were the 3rd most common contraceptives in Zimbabwe, Kenya and Uganda at 8.1%, 5.8% and 5.7% respectively in women aged 40 to 44 years(KDHS, 2014; UBOS, 2017; ZDHS, 2016).

Progestin only contraceptives are safe and effective in perimenopausal women as they do not increase the risk of myocardial infarction and stroke (Bakour et al., 2017). In addition, levonorgesterol intrauterine devices such as *Mirena*^R significantly reduce heavy menstrual bleeding by 90% and are more effective than COCs and progesterone pills (Bofill Rodriguez et al., 2020). DMPA is protective against epithelial ovarian cancer as found by a multicenter case control study of 12 hospitals in Thailand. There was a 39% reduction in risk with an odds ratio of 0.61 (95% CI 0.44 -0.85) compared to non-users. DMPA use for 3 or more years lowered the risk by 83% (p<0.001) (Wilailak et al., 2012).

Although DMPA is relatively long acting progestin contraception, it has its downfalls in women older than 40 years. It can cause fertility delay for 10 months or more a problem not present in other progestin only contraceptives (World Health Organisation, 2015). This can have deleterious effects on women of this age group

who desire to have children with a background of a naturally declining fertility from mid-30's (FSRH, 2017).

DMPA use was noted to reduce bone mineral density (BMD) which was pronounced in the first 2 years of use and there after stabilized to the normal physiological bone loss. These effects were due to the hypoestrogenic state caused by DMPA and this process was noted to reversible as shown by a retrospective study on women who used DMPA for 3 to 10 years (Zeman et al., 2013). In a UK study on 4189 women up to 44 years, DMPA was associated with an increased fracture risk which worsened with longer use. Usage of DMPA for more than 2.5 years (10 prescriptions) was associated with a higher risk of fracture with an odds ratio of 1.46 (95% CI 0.96 – 2.23) (Kyvernitakis et al., 2017). These findings differ from those of Lanza et al., whose study on 312,395 women sought to establish the extent to which DMPA increases fracture risk. 11,822 women had fractures, but this was thought to be due to a pre-existing risk before commencement of DMPA (Lanza et al., 2013). As such, women older than 40 years with increased risk of osteoporosis such as smoking or vitamin D deficiency are advised to use alternative methods (FSRH, 2017).

Cardiovascular risks associated with DMPA use, outweigh the benefits (category 3) in patients with vascular disease, ischemic heart disease, stroke, uncontrolled hypertension of $\geq 160/95$ mmHg or multiple cardiovascular risks. These patients are advised to use alternative methods of contraception (Curtis et al., 2016).

During perimenopausal period, irregular, prolonged or heavy uterine bleeding can occur due to hormonal fluctuation which can be worsened by progestin only contraceptives. This is the main reason for discontinuation of these contraceptives. Therefore, women need to be counseled before commencement (Baldwin & Jensen,

2013). All women older than 40 years with heavy menstrual bleeding should be investigated for gynecological malignancies (FSRH, 2017).

Appendix VIII tabulates the WHO medical eligibility criteria for the different progestin only contraceptives according to the medical condition a patient has.

2.3.3 Intrauterine copper device (IUCD)

It is the 3rd most commonly used method worldwide, accounting for 17% (United Nations, 2019). It was the most commonly used modern method by Turkish women aged 45 to 59 years, of whom, 59.4% had chronic illnesses such as diabetes and hypertension (Şahin & Kharbouch, 2007). On the contrary, Zimbabwe had very low utilization rates of 0.7% and 0.6% for women aged 40-44 years and 45-49 years respectively (ZDHS, 2016).

Perimenopausal women have reduced fertility therefore, copper IUD can be retained beyond the approved duration until menopause. Upon expiry of their utility, IUCDs must be removed due to the risk of pelvic inflammatory disease and postmenopausal bleeding (Baldwin & Jensen, 2013).

Women over 40 years with comorbidities such as hypertension, diabetes, ischemic heart disease and thrombotic diseases can safely use IUCDs because they are non-hormonal and have minimal side effects (Hubacher et al., 2009).

New relationships after broken marriages are common in older women especially in the western world, which exposes them to sexually transmitted illnesses and IUCDs do not confer protection against such. High risk women such as those with multiple sexual partners should be screened for sexually transmitted infections (STIs) and advised on condom use (Baird et al., 2009).

2.3.4 Sterilization

Sterilization is a permanent method of contraception that encompasses bilateral tubal ligation and vasectomy. When compared to developing countries, it is quite prevalent in developed countries such as UK and USA (Black et al., 2009; Firman et al., 2018). In Canada, sterilization was most commonly used by women aged 40 to 49 years, with vasectomy leading at 19.6% and BTL followed at 16.7% (Black et al., 2009). In the UK, vasectomy was used by 28% while BTL was used by 18% of women aged 40 to 44 years (Lader, 2009). In a study done in the USA on contraceptive method and its association with age, 18.5% of women aged 35 to 49 years used sterilization (Firman et al., 2018). In Africa, vasectomy has been shunned, with zero utilization in Uganda, Kenya and Nigeria. In women aged 40 to 44 years, BTL was the 2nd most used method in Kenya and Uganda at 7.1 and 8.2% respectively (KDHS, 2014; NDHS, 2019; UBOS, 2017).

All women over 40 years considering sterilization should be counseled on long acting reversible contraceptives because they are approaching natural sterility and BTL has surgical risks (Bakour et al., 2017,). These women might enter into new relationships with desire to sire children with their new partners, and yet sterilization is a permanent method (FSRH, 2017).

Vasectomy is safer and quicker to perform than BTL, but African men and women have a negative the attitude towards it. In a Nigerian study on knowledge and attitude towards vasectomy among antenatal clinic attendees, fear of impotence among their husbands, cultural unacceptance and the belief that their partners would become unfaithful were some of the reasons that featured prominently (Tamunomie et al., 2016). Lack of evidence based knowledge, religion and low education background

were the hindrances to vasectomy use in a cross-sectional study on 390 men in Rwanda (Ntakirutimana et al., 2019)

2.3.5 Barrier Methods

These include female and male condoms, diaphragm and cervical caps. Male condom is the 2nd most commonly used method worldwide (United Nations, 2019). In a study on women older than 50 years in Botswana, male condom was the most commonly used modern method at 41% for prevention of STIs and / or pregnancy (Ama & Olaomi, 2019). Similarly, in Canada, a prevalence of 42.5% was reported in women aged 40 to 49 years (Black et al., 2009). In Kenya, there is a low prevalence of condom use by women aged 40 to 44 years (2.5%) and 45 to 49 years at 1.8% (KDHS, 2014).

Condoms have the non-contraceptive benefit of reducing sexually transmitted diseases that are known to increase in perimenopausal women who develop new relations. It is also advantageous because women in this age group have reduced coital frequency (Allen et al., 2013).

However, the use of oil based lubricants and estrogen vaginal creams used by women with vaginal dryness to enhance sex have deleterious effects on condoms as they weaken them and cause slippage (FSRH, 2017).

The World Health Organization gives a high failure rate of barrier methods of 13 to 23%. As such, counseling should be done to these women to change to more effective contraceptive methods or to use emergency pills (World Health Organisation, 2015).

2.3.6 Emergency contraception

It is rarely used by women older than 40 years as reported by multiple demographic health surveys in Kenya, Uganda and Nigeria (CSA, 2014; KDHS, 2014; UBOS, 2017).

Options include Levonorgestrel pills, plan B, Ulipristal, Yuzpe and copper IUD (World Health Organisation, 2015).

Age alone is not a contraindication for using emergency contraception. Thus it should be availed to older women who have contraceptive failure (Curtis et al., 2016).

Copper IUDs are the most effective emergency contraceptives. In addition, they have the benefit of long-term contraception until menopause. They should thus be prioritized (Bakour et al., 2017).

Women who are offered Levonorgestrel pills should be counselled on effective contraception which should be commenced concurrently or at the earliest possible opportunity (Bakour et al., 2017).

2.3.7 Traditional methods

They include fertility awareness and withdrawal methods. Fertility awareness methods comprise of rhythm, monitoring of body temperature, cervical mucus and “safe days.”

In Turkey, most women between 45 to 59 years were using traditional methods, with 38.8% using withdrawal and 18% using other traditional methods such as post coital vaginal douching, vaginal aspirin and vaginal sponge soaked with lemon or cola, which were ineffective as sperms travel fast and would have ascended through the cervix by the time douching is done (Şahin & Kharbouch, 2007). In Albania, 47.8% of women aged 40 to 44 years used contraception, out of which 44.5% used

withdrawal method. Similarly, 39.4% of women aged 45 to 49 years used contraception, with withdrawal being utilized by 37.5% of these women in 2017-2018 (Fruhauf et al., 2021). This high use of withdrawal method was due to Albania being the poorest communist country in Europe with no access to modern contraceptives. In addition, there was fear of side effects and more conviction on withdrawal as opposed to modern methods (Fruhauf et al., 2021).

Women older than 40 years may have irregular menses and unpredictable ovulation. Therefore, they should not rely on fertility awareness methods, as they are less effective and have no protective ability against STIs. In addition, there is poor knowledge of safe days in women over 40 years (Aksu, 2016; KDHS, 2014)

2.4 Advice on Stoppage of Contraception by perimenopausal women

For women aged 40 years and above, contraception can be used until menopause is reached. Menopause is a clinical diagnosis made retrospectively after one year of cessation of menses and advice to stop contraceptives is patient-specific depending on their pregnancy risk (FSRH, 2017).

About 45% of women in Kenya reach menopause by age 45 years (KDHS, 2014). Noreh et al did a study on 1078 women in western Kenya and found the median age of menopause to be of 48.28 years (Noreh et al., 1997).

For most women, natural loss of fertility can be assumed at age 55 years but a few cases of spontaneous pregnancies have occurred up to age 59 years (Baldwin & Jensen, 2013). Therefore, women who are not amenorrhoeic after age 55 years should be investigated if they have abnormal uterine bleeding and contraception continued until there are no menses for 1 year (FSRH, 2017).

In traditional practice, women on non-hormonal contraceptives are assumed to be menopausal after 1 year of amenorrhea if they are aged 50 years and over, and after 2 years of amenorrhea in women less than 50 years old (FSRH, 2017). Women over 45 years old can have menstruation or may ovulate even after 1 year of cessation of menses (Shaaban, 1996)

Women more than 50 years old and are on combined oral contraception, should switch to non-hormonal or progesterone contraception because of the cardiovascular risks which increase with age (World Health Organisation, 2015).

Menopause is a clinical diagnosis so blood tests should not be routinely used to diagnose it unless in cases where women are using hormonal contraceptives and it is impractical to stop the contraception method so as to check assess for amenorrhea (Beksinska et al., 2011).

Menopause is not indicated by being amenorrhoeic in COCs users (Linton et al., 2016). This is because perimenopausal women on combined hormonal contraceptives continue to have withdrawal bleeding during the pill-free days or they can experience amenorrhea (Baldwin & Jensen, 2013; Cho, 2018). The table below shows how menopause can be assessed:

Table 1: Diagnosing menopause (Baldwin & Jensen, 2013; Creinin, 1996; Juliato et al., 2007; Miller et al., 2018)

CONTRACEPTIVE	AGE (YEARS)	AMENORRHEA	LABORATORY
Women on non-hormonal contraception	Age <50 Age ≥50	-Amenorrhea for 2 years -Amenorrhea for 1 year	FSH ≥30IU/l on two occasions 6-8 weeks apart.
Women on combined hormonal contraceptive	Starting from age 50	-	FSH ≥30IU/l on two occasions 6-8 weeks apart, tested 7-14 days after use of pill/patch/vaginal ring while using a back-up method
Women using DMPA	Starting from age 50	-	FSH ≥30IU/l on two occasions 90 days apart on the day of injection
Women on levonorgestrel intrauterine device	Starting from age 50	-	FSH ≥30IU/l on two occasions 6-8 weeks apart
Women using or not using a hormonal method	≥60 years	-	Not tested. Menopausal status assumed

There are various methods on how to confirm menopause while on COCs; at age 50 years stop COCs for 2-3 months and observe if menses will resume or monitor follicle stimulating hormone (FSH) and vasomotor symptoms during the pill-free days. FSH should be measured twice, 6-8 weeks apart and values of ≥ 30 IU/L is diagnostic of menopause. A backup contraceptive is advised during the 14-day interval. If FSH is less than 30 IU/L, then the woman is followed up on yearly basis (Creinin, 1996).

It can be challenging to evaluate menopause in women on long term use of Depot medroxyprogesterone acetate (DMPA), and have amenorrhea. For women on DMPA, FSH testing is limited to women above age 50. Two FSH levels of more than 30IU/L taken 90 days apart before DMPA injection, should be diagnostic of menopause (Juliato et al., 2007).

Once the diagnosis of menopause is made in women over 50 years, contraception is continued for one more year. They could then be reasonably switched to hormonal replacement therapy (FSRH, 2017).

2.5 Factors influencing contraception utilization in women aged 40 years and above.

2.5.1 Socio demographic Factors

2.5.1.1 Age

When compared to women aged 15-19 years, women aged 40–49 years were less likely to use contraceptives ($p \leq 0.001$) (Lasong et al., 2020). Palamuleni et al in Malawi, found that women in their 20s had lower contraceptive usage because of desired fertility, those in their 30s required contraception for spacing and women in the 40s did not frequently use contraceptives because of reduced pregnancy risk (Palamuleni, 2013).

Women aged 40-44 years used contraceptives more than those age 45-49 years or above age 50. In Uganda 38.9% of women aged 40-44 years used a form of contraceptives while those age 45-49 years had lower prevalence at 23.3% (UBOS, 2017). Another study in Ghana reported similar finding of more women aged 40-44 years (12.1%) using contraceptives than those age 45-49 years (10%) (Teye, 2013). In Massachusetts according to the behavioral risk factor surveillance records of 2006,2008 and 2010, 77.6% of women aged 45-50 years were at risk of unintended pregnancy and reported contraceptive non-use of 16.8% (Godfrey et al., 2016). Contraception use in women aged 50 years and over is lower as Ama et al in Botswana reported a prevalence of 25.2% (Ama & Olaomi, 2019).

Women of advanced reproductive age in a qualitative study had low perception of being pregnant due to age, so they stopped using contraceptives and in disbelief

presented with unintended pregnancies (Godfrey et al., 2011). Reduced libido in perimenopausal women has an impact on coital frequency and hence contraceptive use. Reduced estrogen levels, stress from the family and adjustments during retirement, low self-esteem due to age-related body changes such as wrinkling may lead to low libido. (Hickey & Banks, 2016; Miller et al., 2018). Other climacteric symptoms such as lack of sleep, urinary incontinence, vaginal dryness with painful intercourse diminish frequency and enjoyment of sex (Hickey & Banks, 2016).

Older women may erroneously think that they are infertile and stop using family planning methods after failing to get pregnant following multiple instances of unprotected sex. (OlaOlorun, 2013). Though fertility rate is reduced in older women pregnancy can occur. Women aged 40-44 years have fertility rate of 8.4 births per 1000 which reduces to 0.2 per 1000 in those 45 years or more, compared with 107.4 births per 1000 among women aged 30–34 years (Allen et al., 2013).

In addition the comorbid diseases such as stroke, arthritis, heart failure affects the sexual frequency and therefore use of contraception in this population of older women (OlaOlorun, 2013).

2.5.1.2 Marital status

Women of reproductive age in 20 African states including Kenya who were never married had a 35% lower odds of using contraception than those who were married (Apanga et al., 2020). In a study conducted in Malawi (Palamuleni, 2013), it was reported that the use of contraceptives among married women increased with the advancement in age. This peaked when women are aged between 40-44 years (Palamuleni, 2013). Couples who are not married might opt to postpone conception using contraceptives, while those who are married, might be content with the number

of children already born, increasing their desire for contraception (Mohammed et al., 2014; Palamuleni, 2013). Married women are traditionally supposed to be sexually active (Asekun-Olarinmoye et al., 2013) thus have a higher coital frequency compared to single women further increasing their need for contraception to either space or postpone childbirth (Asresie et al., 2020). In Botswana, women over 50 years who were married or divorced/separated were 5 times more likely to use FP than the widowed due to reduced coitus (Ama & Olaomi, 2019).

Contrary, Teye in Ghana who looked at women of reproductive age found that unmarried women (23.4%) used contraceptives more than those living with partners (11.7%) or married (11.5%). An in-depth interview revealed that the unmarried women used contraceptives to prevent acquisition of sexually transmitted diseases and avoid pregnancies before marriage (Teye, 2013). In the same study a married woman of advanced reproductive age reported that she would not stop conceiving as the sole purpose of marriage was to sire children thus found no need of using contraceptives. This is a reflection of the African culture in many African states (Teye, 2013).

2.5.1.3 Level of Education

A high level of education is strongly associated with contraceptive use because of better understanding of the available contraceptive method and ability to make informed choice (Koc, 2000).

In Nigeria (Solanke, 2017), it was reported that the likelihood of contraception use significantly ($p < 0.001$) increased with the advancement in the women's level of education. Contraceptive non-use was very high among these women of advanced reproductive age who had no education at 95.5%, while those who attained tertiary education had lower rates of non-use at 56.8% (Solanke, 2017).

Ayoub in Tanzania carried out a study on women's schooling and family planning and found that lower level of education is attributed to early childbearing, large family size and reduced exposure to family planning methods. With attainment of primary school education, contraceptive use increased by a factor of 0.043 while with secondary education by a factor of 0.073 (Ayoub, 2004). More access to education improves the women's economic opportunities further increasing uptake of contraceptives (Ayoub, 2004; Ouma et al., 2015). Bbaale in Uganda found that the more one remained in school, the longer they differed age at 1st birth, and the lesser they desired a large family (Bbaale & Mpuga, 2011).

Increased level of education is associated with increased contraceptives use but this relationship could be influenced by culture, religion and economic status (Larsson & Stanfors, 2014). In many Sub-Saharan countries, women may be empowered in terms of decent employment but due to gender inequality they still have little say on matters such as family size and contraceptive use (Larsson & Stanfors, 2014).

Moreover highly educated women are more likely to be preoccupied with demands of the workplace, leisure activities and prefer to have fewer children with maximum investment of time and energy spent gaining financial security (Larsson & Stanfors, 2014). The study by Larsson on Sub-Saharan countries found that in Kenya women with more education had more contraceptive use but nevertheless used ineffective methods (Larsson & Stanfors, 2014).

Contrary, education was not associated with increased contraceptive use as described by Okech et al in Nairobi, Kenya, rather the income, quality of family planning services and partners approval mattered (Okech et al., 2011).

2.5.1.4 Place of residence

Women who live in rural areas of any age use contraceptive less than those in urban areas. In women of reproductive age in Zambia, less than half (43.1%) of women in rural areas used contraception (Lasong et al., 2020) while Ghana only 9.1% of those in rural areas used contraception (Teye, 2013). Similar outcomes were found in Malawi demographic health survey where in 2004 most (87.3%) women resided in rural areas with only 28.2% using contraceptives. The urban population was low (12.7%) with higher prevalence of contraceptive use (38.2%) than their counterparts (Palamuleni, 2013).

The difference in contraceptive uptake between rural and urban areas is attributed to availability of better social amenities such as education, family planning services, and availability of information on family planning methods in urban areas. Women in rural areas are less exposed to the contraceptive messages through media than those living in urban areas thus affecting utilization patterns (KDHS, 2014).

2.5.1.5 Employment

Women who have formal employment and earn a good income are less likely to have a large family size because of work related engagements while those not working are 26% less likely to use contraception (Palamuleni, 2013). Having a source of livelihood positively increases the women's power to make household, as well as reproductive decisions (Hogan et al., 1999). As compared to housewives, women who work outside the home, use contraceptives more because of the exposure to the outside environment (Hogan et al., 1999).

Formal employment significantly ($p < 0.05$) affected contraceptive use in women aged 50 years or more in Botswana but education and marital status were not significant.

Compared to housewives retirees were less likely to use contraceptives while those unemployed but seeking for employment used contraceptives more. (Ama & Olaomi, 2019).

Analysis of the Uganda National Panel Survey for 800 women aged 15–49 years looking at types of employment and contraceptive use found that employment did not increase the use of modern contraception. Women on off-farm wages used traditional methods which have high failure rates leading to poor spacing between children (Van den Broeck, 2020).

2.5.1.6 Religion

Religion affects use of contraceptives in a complex way varying between different groups and individuals within the groups. Family planning is not discussed directly in religious contexts but people have different interpretations of the religious books such as the Bible and Quaran (Sundararajan et al., 2019). No texts in the scriptures directly refute or support contraceptive use. Quran supports use of contraceptives by promoting strategies that encourage proper upbringing of children but at the same time words from the prophet up laud high fertility (Sundararajan et al., 2019).

Twenty four focused group discussions on contraception among Christians and Muslims with a median age of 40 years in Tanzania revealed that women from both groups supported use of contraception for various reasons. One reason cited was good health for the mothers and children instead of ‘filling the earth’, another reason was that children get proper care and attention and lastly for women to get time to attend to their businesses or jobs to sustain livelihoods (Sundararajan et al., 2019).

The Roman Catholic Church has a firm stand on use of contraceptives. It only allows the use of natural methods and opposes all other artificial family planning methods

such as sterilization, intrauterine device, pills and condoms (Griffin, 2015; LeMaire, 2016). Fertility awareness methods are unreliable in women aged 40 years and above due to erratic ovulation and menses (Aksu, 2016). Despite this, Catholic's defy the advice and continue with the utilization of modern contraceptives. Lasong et al in Zambia found Catholics to account for 17.7% of the study population with about half (47.6%) of them using modern contraception (Lasong et al., 2020). In Ghana, among 359 participants of reproductive age, 16.2% of Christians, 14.5% of Muslims and 8.8% of traditional religion used contraceptives (Teye, 2013). In Nigeria, Muslims and those in traditional religion were less likely to be current users or ever users of contraception as compared to protestants and Catholic's ($p < 0.005$) (Wusu, 2015).

2.5.2 Reproductive factors

2.5.2.1 Age at first birth

In developed countries such Europe, there is a significant number of women deferring childbirth to an advanced age with a mean age at first birth at 28 years. In 2013 in Sweden, about 60% of births were to mothers aged 30 or older while 5 percent to mothers aged 40 or older (Barclay & Myrskylä, 2016). Earlier on pregnancy at age 35 and above was considered late but times have changed and the threshold has moved to age 45 (Bouzaglou et al., 2020). Contrary in Kenya , half of the women have begun child bearing by age 20 (KDHS, 2014).

A survey carried out on 518 women when they were aged 22 years and childless, 34% of them were still childless at 32 years of age. Some of the family factors associated with postponing childbirth were living in big towns, with the parents, not desiring a child and having well educated parents (Waldenström, 2016).

A cross sectional study on 365 women who were childless at age 28, 32, 36 and 40 or more in Sweden found that the older population aged 36 years and above, cited the main reason as to not finding a suitable partner. Other factors such job opportunities, fertility problems, pursuing education were not as important as the issue with finding a partner (Waldenström, 2016). Another reason for delayed child birth is the advancement in artificial reproductive technology where a donor oocyte can be used giving women a chance who prioritized their careers to have a child even later in life (Bouzaglou et al., 2020)

Women who get their first child at an advanced age are either unemployed or have a very good income. Other factors such as having a low level of education, a constricted social circle or having a partner they are not satisfied with (Nilsen et al., 2012).

Pregnancies at or above age 40 years is considered high risk. When compared with pregnancy outcomes in younger women aged 25-35 years, there was increased risk of gestational hypertension (3.1 vs 1.1% $p < 0.001$), preterm birth (10.4 vs 6.5% $p < 0.001$), emergency caesarian section (50.4 vs 13.9% $p = 0.001$), gestational diabetes (14.5 vs 6.9%) in women over 40 years. Intrauterine fetal death was higher in older women at 2.1%. Therefore older women need closer monitoring during pregnancy (Bouzaglou et al., 2020).

As age at first birth increased, the proportion of contraceptive non-users decreased. Solanke in Nigeria (2017) found that those who first gave birth at age 14 years or less 91.4% did not use contraceptives while those who had their first birth at age 25 years or older 72.7% did not use contraception (Solanke, 2017).

2.5.2.2 Parity

The average number of children that a Kenyan woman aged 40-49 years has is five according to 2014 demographic survey. This raises among women in Western Kenya where the average is seven children (KDHS, 2014).

Many research studies have indicated that women with a high parity use contraceptives more than those with low parity or with no children. Solanke in Nigeria reported that women of advanced reproductive age who were multiparous(3-4 children) had lesser contraceptive non-use (66.8%) than those who had a low parity(1-2 children) at 89.6% (Solanke, 2017). Similar findings were in Zambia where only 3.2% of those who had no children used contraception, raising to 43.1% among those with 5 or more children (Lasong et al., 2020). Mohammed et al in north Ethiopia found that women of reproductive who were grand multiparous (5 or more children) used modern contraceptives 3 times less than those without children. Explained by most of them being of advanced age with high likelihood of reduced sexual intercourse thus low risk of pregnancy (Mohammed et al., 2014)

Women with many children have a lower desire for children, further increasing contraception uptake compared to low parity women who might still desire to conceive (Okech et al., 2011). In their early reproductive years, women desire to space births, however, this stops after the desired family size is achieved (Okech et al., 2011).

2.5.2.3 Fertility desire

The groups of women with a fertility desire are those who have not achieved the desired family size, have not started having children due to issues of infertility or are in search of better socioeconomic status (Nilsen et al., 2012).

A Kenyan study on women of reproductive years found 89% of contraceptive non-use among women with a fertility desire (Okech et al., 2011). This was similar to an Ethiopian study where 82.6% respectively of those with a fertility desire did not use contraception (Amhara et al., 2014). In Nigeria women 35 to 49 years with fertility intentions had less use of contraceptives (9.6%) as compared to those who did not want more children (28.1%) (Solanke, 2017).

With intention to have children there is no need of contraceptive use for spacing or limiting children (Mohammed et al., 2014; Okech et al., 2011).

2.5.2.4 Premenopausal symptoms

There are four core symptoms of menopausal transition which are hot flashes, mood disorders, poor sleeping and vaginal dryness. Hot flashes occurs in 30-70% of women during the premenopausal period and persists in up to 20% of those in their 50s, 10% in their 60s and 5% in their 70s (Freeman et al., 2011; Santoro, 2016). For most women, the symptoms diminish within a year or two but 30% have severe symptoms which reduces the quality of life. Sleep in these women is affected and can further cause anxiety or depression. Obesity, smoking and being African-American has been associated with increased risk of hot flashes (Freeman et al., 2011) .

Sleep difficulty or insomnia is common as women advance to age 40 and beyond. It has been associated hormonal fluctuations and or hot flashes. In addition arthritis, mood instability and the natural ageing also contribute to poor sleep (Santoro, 2016).

Vaginal dryness and other genitourinary symptoms of menopause such as vaginal irritation, urine incontinence can occur in a quarter to one third of women during transition of menopause. This is a result of low estrogen level and it worsens over time without treatment (Freeman et al., 2011).

Mood disorders include depressive symptoms and anxiety. Presence of hot flashes, smoking, high body mass index, and stressful life increased the risk of depressive symptoms (Bromberger & Kravitz, 2011). Depressive symptoms do not meet the criteria for a major depressive disorder. Major depressive disorder is a life threatening disease with at least 2 weeks of depressed mood, significant weight loss, feeling of worthlessness and insomnia (Bromberger & Kravitz, 2011).

There are no reported studies on how the presence of premenopausal symptoms as described above affect contraceptive use but these symptoms generally affects the woman's perception of conceiving, sexual frequency and eventually contraceptive use (FSRH, 2017). Combined oral contraceptives treat some of this symptoms such as hot flashes, but many women of advanced age believe it is dangerous to take these pills (Cho, 2018).

2.5.3 Clinical factors

Women over 40 years face many chronic diseases with advancing age. Cardiovascular disease (hypertension, diabetes mellitus type 2, ischemic heart disease), obesity, musculoskeletal diseases (arthritis, bone fractures), gynecological malignancies and benign diseases such as fibroids among others (Şahin & Kharbouch, 2007). The cardiovascular diseases such as diabetes mellitus, hypertension, cardiac disease and malignancies were looked at in this study as they have great pregnancy-related morbidity and mortality (FSRH, 2015; Mekonnen et al., 2015). They will be discussed below:

2.5.3.1 Diabetes mellitus

Diabetes mellitus with poor glycemic control is associated with pregnancy related complications such as spontaneous abortion which increases five-fold. Fetal congenital anomalies and death, maternal gestational hypertension and heart disease are also increased (Chuang et al., 2005; Mekonnen et al., 2015). A population-based cohort study (2020) in China of 6.4 million women, researching on adverse pregnancy outcomes in those with uncontrolled preconception diabetes found odds ratio for spontaneous abortion 1.11($p<0.001$), preterm birth 1.13($p<0.001$), macrosomia 1.17($p=0.008$), small for gestational age 1.59($p<0.001$) and birth defects 1.42 ($p=0.002$) as compared with women who had a normal fasting glucose during pre-conception (Wei et al., 2019).

In Michigan and Algeria 74.8% and 89% of diabetics used contraception higher than a study in Ethiopia 53.8%. Countries with better economies have high prevalence of contraceptive use unlike developing countries where patients with chronic disease including diabetics have poor access to health care (Mekonnen et al., 2015).

Women with chronic illnesses such as diabetics may not be aware that hormonal contraceptives including combined hormonal contraceptives can be safe for them (Phillips-Bell et al., 2016). According to world health organization medical eligibility criteria 2015 for diabetes mellitus states that those with vascular disease, nephropathy, retinopathy, and uncontrolled blood sugars are excluded from using combined oral contraceptives (World Health Organisation, 2015) but there many others who are eligible. Health practitioners should assess the suitability of a contraceptive method on individual basis and have in mind that the benefit of an effective contraception among the diabetics outweighs the risk of unintended pregnancy (Phillips-Bell et al., 2016).

Diabetic patients are more likely to use less effective contraceptives such as condoms, diaphragms and natural methods than the non-diabetics as reported by Phillips-bell et al in Florida at 41.5% versus 22%. This put them at risk of unintended pregnancies. In that study 21% of diabetics did not use any form of contraceptives while 48% used an effective method (Phillips-Bell et al., 2016).

A study in Ethiopia on diabetes mellitus and hypertensive patients who most (67%) were aged over 35 years old and about half (49.5%) had diabetes mellitus, only half of them used modern contraceptives (53.8%). Specific contraceptives used were DMPA (39.8%), IUCD (18%) and pills (16.1%). Only 1.8% used natural method.

In the United Kingdom, Mazaheri et al studied the patterns of contraceptive use in the diabetics and reported that women with type 2 diabetes were less likely to be given a combined oral contraceptive RR 0.39 (95% CI 0.24,0.62) than the non-diabetics. DMPA was significantly more likely to be given to women with diabetes especially type 2 diabetes risk ratio (RR) 3.57 (95% CI 2.15, 5.60) (Mazaheri et al., 2009).

An Iranian study on diabetic women, hypertensive and obese women, those aged 45 to 54 years 38.3% had diabetes mellitus type 2 and 57.8% were hypertensive. Difference arose after diagnosis of the above chronic illness. Before diagnosis both the diabetics and the hypertensive patients mostly used hormonal contraceptive at 71.6% and 78.3% respectively. After the diagnosis withdrawal was the most prevalent among the diabetics (41.6%). This was due to fear of side effects with the hormonal methods (Nojomi et al., 2013).

An older study of women with diabetes mellitus about aged between 17 to 52 years living in Italy had contraceptive prevalence of 70%. Most clients use ineffective methods of contraception such as barrier and/ or natural methods (47%). One third

(30.4%) used hormonal methods and 12% had IUCDs. Concerning patients were those who were smokers and used combined oral contraceptives (Napoli et al., 2005). Smoking more than 15 cigarettes a day plus being diabetic is a contraindication for COCs due to the increased risk of thrombosis (World Health Organisation, 2015).

Overall progestin-based contraceptives are safe in diabetics until menopause similar to copper intrauterine device. Combined oral contraceptives can be used in those without macro vascular or microvascular disease or complications thus careful selection is required (Chuang et al., 2005; Nojomi et al., 2013). Concerns about bilateral tubal ligation is in those diabetics with uncontrolled sugars which can lead to poor wound healing (Afsana, 2016).

2.5.3.2 Hypertension

Hypertension is the most common cause of cardiovascular disease worldwide affecting about one billion people. It is the leading cause of cardiovascular related deaths and mortality following a stroke (Afshari et al., 2021). Incidence of hypertension in women increases with the advancement of age with women older than 40 years having the most risk (Long et al., 2015). Women over 40 years of age are therefore more likely to become pregnant with a pre-existing hypertensive disease (Long et al., 2015; Mekonnen et al., 2015). Hypertensive disease in pregnancy is the 3rd leading cause of maternal mortality in Kenya (Ndwiga et al., 2020)

In Kenyatta National Hospital which is the biggest referral hospital in Kenya, a study on 620 patients with preeclampsia and eclampsia was done to find out the adverse maternal and perinatal outcomes. Women with early onset preeclampsia (<34 weeks gestation) had worse outcomes with greater odds of renal impairment OR 1.7 (95% CI 0.7–4.1; $p = 0.192$), hemolysis elevated liver enzymes low platelets (HELLP)

syndrome OR 4.3 (95 CI 2.0–10.2 $p < 0.001$), neonatal death OR 8.5 (95 CI 3.8–21.3 $p < 0.001$) and antepartum hemorrhage OR 5.8 (95% CI 1.1–56.4 $p < 0.001$) than women with late onset preeclampsia after 34 weeks gestation (Ndwiga et al., 2020). Therefore contraception to avert unwanted or unintended pregnancy is vital in these women (Allen et al., 2013; Kelsey, 2012).

In Iran, a majority of women over 45 years used hormonal contraceptives (78.3%) before the diagnosis of hypertension. After the diagnosis they reverted to traditional method specifically withdrawal at 35.4% with lowered hormonal contraceptives use at 10.6% (Nojomi et al., 2013). This is because some viewed hormonal contraception as risky to their medical condition (Nojomi et al., 2013).

A cross sectional study by Mekonnen et al in Ethiopia on contraceptive use in women with diabetes mellitus and hypertension had 35.7% of women who are hypertensive. Most were aged more than 35 years old (67.1%) and most used DMPA (39.8%). Withdrawal was the least utilized method at 1.8% (Mekonnen et al., 2015).

2.5.3.3 Cardiac/heart disease

The risk factors for cardiac disease are advanced age, medical diseases such as diabetes and hypertension, smoking and obesity. Rheumatic heart disease is the most prevalent cardiac disease in Sub Saharan Africa accounting for 70% (Poli et al., 2020). Pregnancy in women with cardiac disease is considered a life threatening condition with serious adverse effects including death (Malin & Wallace, 2019). Even in high resource centers such as Europe, the maternal and fetal morbidity is still high at 17% and 21% respectively. Heart failure was at 11% and cardiac arrhythmias in 2% while caesarian section rate was 44% (J. Roos-Hesselink et al., 2020). A study on pregnancy outcomes of cardiac patients at Moi Teaching and Referral Hospital in the

year 2020 revealed a maternal mortality of 12.2% and early neonatal death prevalence of 12.6% (Poli et al., 2020).

Contraception counselling and utilization in cardiac patients is life-saving especially in those who pregnancy is contraindicated (Malin & Wallace, 2019). Cardiac patients could also be using drugs which are teratogenic such as angiotensin converting enzyme inhibitors, therefore effective contraception is required so as to plan for pregnancies by changing the drugs in preconception period (Hudsmith & Thorne, 2007; Roos-Hesselink et al., 2015) . Studies on cardiac patients have reported no counseling (35% of patients) or inappropriate counseling (30%) or improper administration of contraceptives such as combined oral contraceptives in patients with high risk of thromboembolism (Roos-Hesselink et al., 2015).

Combined hormonal contraceptives are World Health Organization eligibility criteria 3 (risks outweigh benefits) or 4 (contraindicated) in cardiac patients specifically in those with ischemic heart disease, venous or arterial thrombosis or stroke (World Health Organisation, 2015). Progestin only contraceptives are a very good contraceptive option for women of any age with cardiac disease including those with arrhythmias, on anticoagulation and heart failure (Hudsmith & Thorne, 2007). Levonorgestrol intrauterine device is a suitable method in controlling heavy menstrual period in perimenopausal women. Unfortunately in cardiac patients, it has to be done in a cardiac unit or in theatre under anesthesia because of the risk of vasovagal reaction in about 5% of patients during insertion (Roos-Hesselink et al., 2015). Copper intrauterine device is also safe in cardiac patient but due to the risk of endocarditis post insertion is advisable to give prophylactic antibiotics in very high-risk patients such as those with prosthetic valves. Prophylactic antibiotics is not

recommended in other patients (Hudsmith & Thorne, 2007; Roos-Hesselink et al., 2015).

The prevalence of contraceptive use in cardiac patients is underreported. A mixed study in Uganda in women aged 15-55 years with rheumatic heart disease reported a low prevalence of 14% of contraceptive use despite being on warfarin treatment. Many also became pregnant while on warfarin yet it is teratogenic. 72% of them reported that warfarin did not affect the fertility desire because of societal expectation to sire children (Chang et al., 2018).

The Global Rheumatic Heart Disease Registry study, done on 12 African countries, found only 3.6% of those aged 12-51 years with rheumatic heart disease used contraception (Zühlke et al., 2015).

2.5.3.4 Cancer

Contraceptive use is challenging in women with cancer with complex decisions being made before treatment, during treatment and post-treatment to avoid pregnancies (Blümel & Vallejo, 2020).

Most chemotherapeutic agents are teratogens and administration in the 1st trimester result in fetus with congenital anomalies (Quinn et al., 2014). Chemotherapy, radiotherapy and ovarian surgeries affect the ovarian reserve or even cause ovarian failure. The post treatment ovarian function is affected by the patient's genetics, age at cancer treatment and treatment used (Gompel et al., 2019). But many cancer survivors still remain fertile thus effective contraception is required to curb unintended pregnancy (Harries et al., 2020).

In general, combined oral contraceptive is contraindicated in those with active cancer and within six months post therapy because of the increased risk on venous thromboembolism (Vessey & Painter, 2006).

A cross section study by Quinn et al on 107 women recently diagnosed with cancer found a prevalence of 76.6% of contraceptive use. About a third (35%) were using less effective contraceptives such as natural or barrier methods. Factors that increased use of effective contraception was high education level: tertiary level ($p=0.038$), non-breast cancer ($p=0.046$) and coitus during treatment (0.012) (Quinn et al., 2014).

In California, a look into the cancer registry of women up to age 40 who survived non-gynecological cancer such as leukemia, lymphoma and breast cancer found high unmet need for contraception at 35%. In this study, contraceptive prevalence was low at 31% with most women using non-hormonal contraceptives such as barrier method (15%), IUCDs (6%), vasectomy (4%) and BTL (3%). Only 61% of patients were counseled on fertility and contraceptive use before treatment (Letourneau et al., 2011).

Another study by Quinn et al on-cancer survivors with non-gynecological cancers in women up to 40 years found a three times risk of unintended pregnancy in these women (21%) as compared to those of general population in the United States (7.3%). Barrier methods were most commonly used at 25.5%, hormonal at 24.5%, vasectomy at 17.5% and IUCD at 7.2% (Quinn et al., 2014).

A qualitative study by Jane et al at Cape Town on fertility intentions and contraception in women up to 49 years old with breast cancer, found that three quarters of them were using contraceptives. Half of them used IUCDs and the others utilized sterilization and condoms. The striking finding in that study was that very few

women reported the counseling on future fertility and methods of preserving fertility before treatment commenced. Advice on change of contraception to a non-hormonal one such as IUCD or avoidance of pregnancy during treatment was availed (Gompel et al., 2019). This points a very big gap to be filled by health care givers on proper counseling of cancer patients before, during and post treatment during follow up including their fertility intentions (Gompel et al., 2019; Quinn et al., 2014).

2.6 Conceptual Framework

The independent variables are the sociodemographic and reproductive and were adapted from various studies of women of advanced reproductive age. Solanke, 2017 in Nigeria looked at factors affecting contraceptive use and non-use in women of advanced reproductive age and contributed markedly in selection of the independent variables in this study (Solanke, 2017). They looked at maternal age, parity, age at first birth, fertility desire, maternal education, place of residence and employment as factors affecting contraceptive utilization. Sahin, 2007 in Turkey on contraception in perimenopausal women in addition studied chronic disease such as cardiovascular disease, number of abortions, births and body mass index, alcohol and cigarette use (Şahin & Kharbouch, 2007). Ama et al, 2018 in Botswana published a paper on family planning in women older than 50 years old and contributed several sociodemographic factors such as age, marital status, education level and employment status to this study (Ama & Olaomi, 2019). .

The dependent variable is contraceptive use which could either be modern or traditional. Modern contraceptives are either hormonal or non-hormonal. This study hypothesized that the selected independent variables affect contraceptive utilization. The clinical characteristics which are the cardiovascular diseases are intervening variables between sociodemographic and reproductive characteristics and the

contraceptive utilization and choice. Below is a diagrammatic representation of the conceptual framework which explains the interrelationship between the variables.

(Figure1).

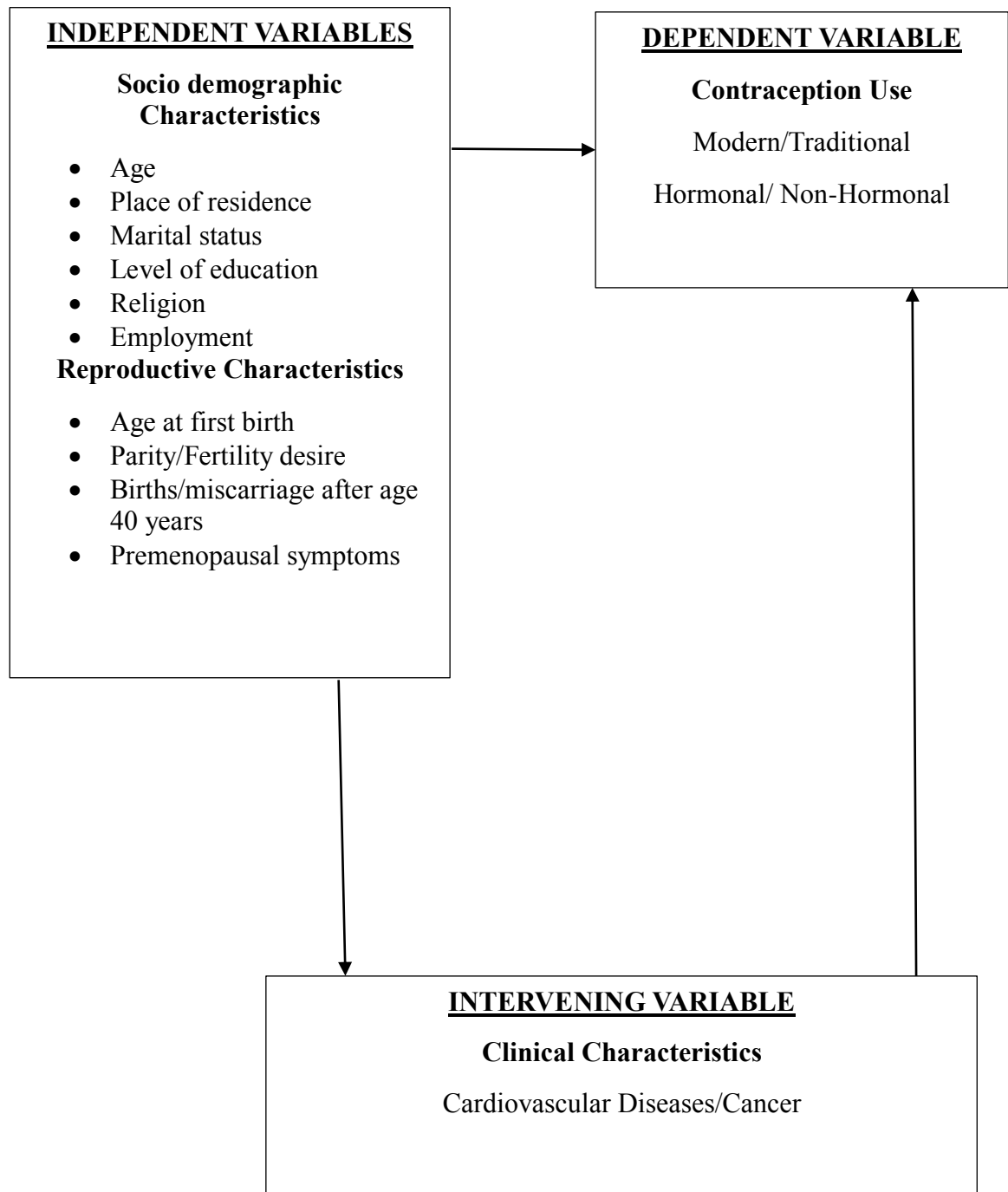


Figure 1: Conceptual Framework

CHAPTER THREE

3.0 METHODOLOGY

3.1 Study Setting

The study was carried out at Moi Teaching and Referral Hospital (MTRH) which is the largest hospital in Western Kenya. It is the second largest tertiary referral hospital in Kenya. It is located in Eldoret town, along Nandi road, in Uasin Gishu County. It serves about a population of about 24 million people from 23 counties in Kenya, Tanzania, South Sudan, Eastern Uganda and Democratic Republic of Congo. It has a bed capacity of about 1020 beds. It is the teaching hospital for Moi University School of Medicine and is also a training center for diploma students of Kenya Medical and Training College (Moi Teaching and Referral Hospital website; <http://www.mtrh.go.ke>).

Moi Teaching and Referral Hospital consultant outpatient clinics, attending to more than 5000 patients per month both new and revisits that are booked for follow up of acute and chronic illnesses. The clinics operate on daily basis from Monday to Friday with each clinic operating on specific days of the week. For example, Gynecology clinic operate on Tuesdays and Wednesdays. The Consultant clinics include: Gynecology, Ear Nose and Throat, Surgical, Cardiothoracic, Orthopedic, Neurology, Neurosurgery, Plastic Surgery, Medical, Diabetic, Rheumatology, Pediatric, Neonatal, Dermatology, Eye, Cardiac: Adult and Pediatric, Gastrointestinal, Urology, Renal, Chest, Psychiatry, Hematology/Oncology: Adult and Pediatric, and Alcoholic and Drug Abuse among others (MTRH records, 2018).

Moi Teaching and Referral Hospital was chosen as the study site because of its unique nature of offering primary, referral and specialized health services by a well-trained workforce. There is a diversity of patients who were aged over 40 years which gave a

vast experience of the situation at the time of the study. There are limited studies on contraception in older women in this institution yet it has a big catchment area and has family planning clinics. Women over 40 years old are on follow up in various specialist outpatient clinics in MTRH and this study provided an eye opener to the situation on the ground regarding their contraceptive use and factors affecting utilization. This will help inform both healthcare practitioners and policy makers on how to improve contraceptive uptake.

3.2 Study Design

This was a cross-sectional descriptive study that was hospital-based.

3.3 Study Population

The study population was all women attending MTRH Consultant clinics. The target population was women aged 40 to 55 years attending consultant outpatient clinics at MTRH. The number of women aged 40 years or more attending the specific clinics on a monthly basis was: 24 in surgical outpatient, 37 in orthopedic, 40 in psychiatric and 20 in gynecology outpatient clinic among others listed in table 2 below.

3.4 Eligibility Criteria

3.4.1 Inclusion criteria

Women aged 40-55 years attending consultant outpatient clinics, who were still having menstrual periods or have less than one year since their last menstrual period. Those who are non-pregnant based on history, the sexually active and those who gave consent to voluntarily participate in the study.

3.4.2 Exclusion criteria

Women who are clinically postmenopausal with ≥ 1 year following their last menstrual period associated with climacteric symptoms. Women who have surgical

menopause such as those with a history of hysterectomy or oophorectomy. Very ill patients who came for reviews in the consultant clinics.

3.5 Sample Size determination

One of aim of the study was to determine the proportion of contraception use in women aged 40 years and above attending outpatient clinics at MTRH. According to KDHS 2014, contraception use was at 43.4% in women aged 40-44 years and 31% in those aged 45-49 years (KDHS, 2014). Thus, the average utility of contraception for women between 40-49 years is 37.2% using the Cochran formula.

$$n = \frac{Z^2 Pq}{d^2}$$

$$n = \frac{1.96^2 \times 0.372 \times (1 - 0.372)}{0.05^2}$$

$$\approx 359$$

Where:

- Z (=1.96) is the z-value at 95% Confidence Interval
- P = 37.2% is the average use of contraception among women aged forty years or more in Kenya (KDHS, 2014).
- q= 1-p
- d= 5%; is the margin of error.

3.6 Sampling Technique

Departments	Outpatient Clinics	Average monthly attendance	Average annual attendance	Proportion per department	≈Proportionate sample size of each department	≈Sample size of each clinic (n)
INTERNAL MEDICINE	Medical	20	240	0.361	129	24
	Renal	6	72			7
	Diabetic	35	420			41
	Neurology	5	60			6
	Chest	4	48			5
	Cardiac	30	360			36
	Dermatology	6	72			7
	Rheumatology	3	367-			3
MENTAL HEALTH	Psychiatry	40	240	0.142	51	47
	Alcohol and Drug Abuse	3	18			4
SURGERY	Surgical	24	288	0.348	125	29
	Orthopedic	37	444			44
	Urology	1	12			1
	Plastic	1	12			1
	Neurosurgery	36	432			43
	Cardiothoracic	6	72			7
ONCOLOGY	General oncology	25	300	0.083	30	30
OBSTETRICS AND GYNECOLOGY	Gynecology	20	240	0.066	24	24
Totals		303	3636	1	359	359

Table 2: Sampling techniques

The outpatient clinics were stratified into 5 strata representing the different departments (Medical, Surgical, Reproductive, Psychiatry and Oncology) as shown in table 2 above. Pediatric department was left out due to age.

Proportionate allocation method was used select the number of participants from each clinic as indicated in the table 1 above. This was based on the average monthly attendance of women aged 40 to 55 years in each clinic from the hospital records in the preceding two years (MTRH records 2019 and 2018). Systematic random sampling was then applied in recruiting female participants from each clinic who are 40-55 years old. The sampling interval in each of the clinics was determined as $K = N / n$.

For instance, in the gynecology clinic the number of women aged 40-55 years per month is **20**. In one year, it is $20 \times 12 = 240(N)$. The calculated sample size is **24(n)**. So: $K = 240 / 24 = 10$. Therefore, the interval was 10 which applied to all the clinics.

The first participants were sampled using simple random sampling method. This was done by randomly picking a number between 1 and 10. The number represented the 1st patient to be picked and this was done in every clinic. After the 1st patient was identified every 10th patient was sampled until the desired sample size was attained in each clinic. If the patient declined to consent to the study, the next 2nd patient was picked.

3.7 Study Procedure

The primary point of participants' entry into the study was the designated MTRH consultant clinics at which operate from Mondays to Fridays. The principal investigator and the three research assistants approached the staff manning the consultant outpatient clinics and got permission to proceed with study. Women who are between 40 to 55 years were identified from the daily clinic register at the nursing station in each clinic. Of note, patients in each clinic on arrival, would be registered and vitals taken at the nursing station. Simple random sampling was done to get the first patient and then systematic sampling from then onwards where every tenth participant was selected.

While on the waiting bay, the patients were approached. The age of the patients was confirmed either verbally or by use of a national identity card. They were then introduced to the study and participants who met the inclusion criteria and gave a written consent were interviewed guided by the questionnaire. If a patient declined or did not meet the inclusion criteria, the next patient was picked. Data was also collected from the patients file to corroborate the information. The participants about to see the clinician were interviewed after the consultation to avoid inconveniences. The recruitment was done for a period of one year. Covid-19 protocols were adhered as this study was done during pandemic. It included wearing of face masks all the time by the researchers and the patients. Keeping a social distance of about 1 meter done and interviewing the patients in a room with open windows or in the waiting bay as long as privacy was observed. Frequent hand sanitization with alcohol-based sanitizers was done and also hand washing with soap and tap water.

3.8 Data Variables

3.8.1 Dependent variable

The dependent variable is current use or non-use of contraception. Women who reported using contraceptives were grouped as either using a modern, traditional or other method. Modern contraceptives were re-classified into hormonal methods and the non-hormonal methods. Women using rhythm and withdrawal methods were grouped as using traditional contraception. Reasons for contraceptive non-use were also documented. Women who were currently using more than one method are classified by the method that was most effective in preventing pregnancy.

3.8.2 Independent variable

The selection of the independent variables were guided by literature such as (Şahin & Kharbouch, 2007; Solanke, 2017) though there is paucity of publications.

The variables were either classified as barriers or promoters of contraceptive use and they included:

1. **Social demographic variables:** age, marital status, partnership status, level of education, occupation, area of residence, religion. Some of the variables were re-classified. Age was grouped into three categories which were: 40-44, 45-49 and 50 and over years. Marital status was classified as married, single, divorced or separated and widows. Religion was classified as protestant, Roman Catholic and others. Partnership status was either living or not living with partner.
2. **Clinical data:** Chronic or other comorbid diseases. Cancer and cardiovascular disease such diabetes mellitus, hypertension, cardiac disease was further analyzed in this study as they cause significant morbidity and mortality in pregnancy.

3. **Reproductive characteristics:** parity, age at 1st birth, fertility desire, births after 40 years, miscarriage after 40 years and perimenopausal symptoms. Parity was grouped into four: none (no children), low parity (one to two children), multiparous (three to four children) and grand multiparous (five or more children)

3.9 Data Collection and management

Data was collected using interviewer administered questionnaire and patients' medical file. The specific data collected included demographics, clinical and reproductive characteristics of the participants. It also included contraception use or non-use and the type of contraception utilized. At the end of each day, data collection questionnaires were verified for completeness. Serial numbers were used in order to protect patients' identity.

Data captured was coded according to the clinic and patient then entered into an electronic database. It was then cleaned using Microsoft Excel. The database was encrypted and password was accessible to the investigator alone. The questionnaires were kept in a safe cabinet.

3.10 Data Analysis

The data collected using the questionnaires were coded for each clinic and respondent. Data was verified and then analyzed using Statistical Package for Social Science (Version 24). The Statistical computation of descriptive statistics such as frequencies and the corresponding percentages were used to summarize categorical variables such as level of education and marital status. Continuous variables such as age, duration of relationship and number of children were summarized using mean and the corresponding standard deviation if the normality assumptions hold else the median and corresponding inter quartile range were used.

Inferential statistical techniques such as Pearson chi-square tests and Fischer's exact test (Critical Value ≤ 0.05) and Odds ratios (95% Confidence Interval) were used to compare the level of significance between independent variables and the dependent variable which was contraceptive use. Multivariate logistic regression was used to adjust for confounders of contraceptive use. Results were presented using tables and graphs.

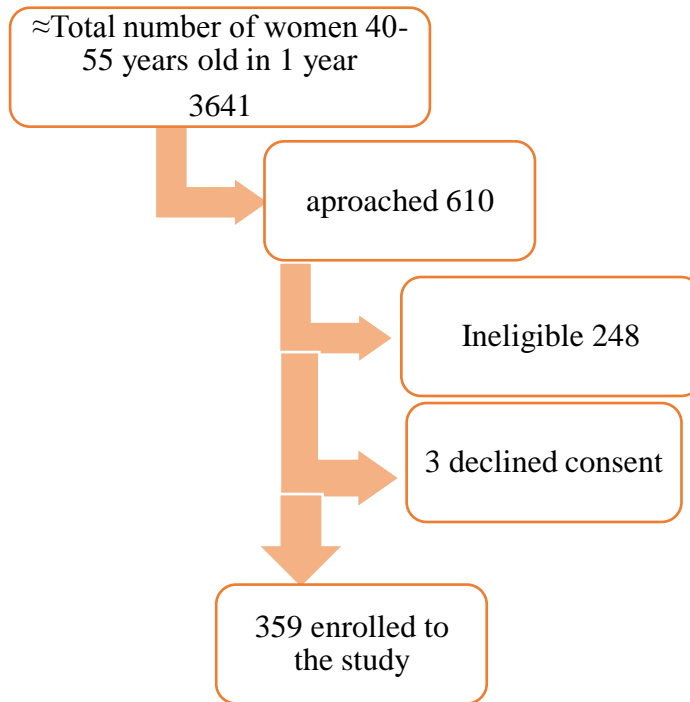
3.11 Ethical Considerations

1. Ethics review and approval were sought before the study commenced from the Moi Teaching and Referral Hospital/Moi University School of Medicine Institutional Research and Ethics Committee (IREC). Amendments were also done through IREC. IREC number **IREC/2017/237**.
2. Informed consent was sought before patients were enrolled into the study. Informed consent was both in English and Swahili language. No one was forced or intimidated to participate in the study.
3. All patients/guardians were informed about the study and the procedures involved in the study.
4. No incentives or inducements were used to lure patients to participate in the study and they had the liberty to withdraw from the study at any point.
5. Confidentiality was maintained throughout the study. The data collection forms used neither contain the names of the patients nor their personal identification numbers. Data collecting material was kept in a locked cabinet during the study period.
6. The computers for data entry and analysis had a password accessible to the principal investigator only.
7. Findings and recommendations of this study will be shared with the stakeholders. It will also be available for academic reference in the College of Health Sciences Resource Centre.

CHAPTER FOUR

4.0 RESULTS

4.1 Recruitment Flow Chart



The recruitment took place for 1 year from January 2020 to December 2020. The hospital records showed an estimate of 3636 women aged 40-55 years who attended the sampled consultant clinics in the year of 2020. 610 women were approached as the target population and 248 were ineligible: 186 were menopausal, 28 were sexually inactive, 23 had history of hysterectomy and 11 participants were very ill. 3 declined consent and 359 were enrolled into the study.

4.2 Socio demographic and Clinical Characteristics of the Study Participants

4.2.1 Socio demographic Characteristics of the Study Participants

This study enrolled 359 women aged 40 years and above and seeking medical care at the Moi Teaching and Referral Hospital outpatient clinics for various ailments. The mean age of the study participants was 44.8 (± 3.7) years with the most frequent age group being 40-44 years (52.1%; n=187). Most of the participants were married (72.1%; n=259), lived in rural settings (65.2%; n=234) with their partners (60.7%; n=218), had at least primary level education (50.1%; n=180) and 282 (78.6%) professed the protestant Christian faith (Table 4.1).

Table 4.1: Participants' Socio demographic Characteristics N=359

Socio demographic Characteristic	n (%)
Maternal age	
40-44	193 (53.8%)
45-49	120 (33.4%)
≥ 50	46 (12.8%)
Place of residence	
Rural	234(65.2%)
Urban/Town	125(34.8%)
Marital status	
Married	259(72.1%)
Single	48(13.4%)
Divorced/ Separated.	35(9.7%)
Widow	17(4.7%)
Partnership status	
Living with partner	232(64.6%)
Not living with partner	127(35.4%)
Maternal education	
None	20(5.6%)
Primary	180(50.1%)
Secondary	110(30.6%)
Tertiary	49(13.7%)
Formal Employment	
Yes	43(12%)
No	316(88%)
Religion	
Protestant	296(82.5%)
Roman Catholic	60(16.7%)
Others	3(0.8%)

4.2.2 Reproductive Characteristics of the Study Participants

Majority (63%) of the women enrolled gave birth to their first child when they were aged 20-34 years followed by those who had their first birth at 19 years or less (32.9%). The most frequent (45.4%) parity was 3-4 followed by those with a parity of 5 or more at 35.4%. More than four-fifths (86.6%) of these women had a fertility desire with 6.7% having had a planned birth after the age of 40 years, 7% had a history of miscarriage past 40 years of age and nearly half (41.5%) with premenopausal symptoms (Table 4.2).

Table 4. 2: Reproductive Characteristics of the Study Participants N=359

Reproductive Characteristic	n (%)
Age at 1st birth	
None	7(1.9%)
≤19	118(32.9%)
20-34	226(63.0%)
≥35	8(2.2%)
Parity	
0	7(1.9%)
1-2	62(17.3%)
3-4	163(45.4%)
≥5	127(35.4%)
Fertility desire	
Wants /More children	48(13.4%)
No more children	311(86.6%)
Births after 40 years	
None	283(78.8%)
Planned	24(6.7%)
Unplanned	52(14.5%)
Miscarriage after 40 years	
Yes	25(7%)
No	334(93%)
Premenopausal symptoms	
Yes	149(41.5%)
No	210(58.5%)

4.3 Proportion of women aged 40 years old or more using contraception at MTRH outpatient clinics.

This study reports that less than half 160 (44.6%) of all the participants enrolled were using contraceptives (Table 4.3).

Table 4. 3: Proportion of contraception use (N=359)

Contraception Use	Frequency	Percentage (%)
Yes	160	44.6
No	199	55.4

4.4 Contraception methods used by women aged 40 years and above MTRH outpatient clinics.

This study reports that the most common contraceptive methods were Depot medroxyprogesterone acetate (23.1%) followed closely by bilateral tubal ligation (22.5%), implants 19.4% (Jadelle at 12.5% and Implanon at 6.9%), copper intrauterine device (17.5%), and condoms at 6%. The least frequent contraception methods were emergency pills, combined oral contraceptives and withdrawal. One participant (1%) used Chinese monthly pill for contraception which is unregistered in Kenya (Figure 4.2).

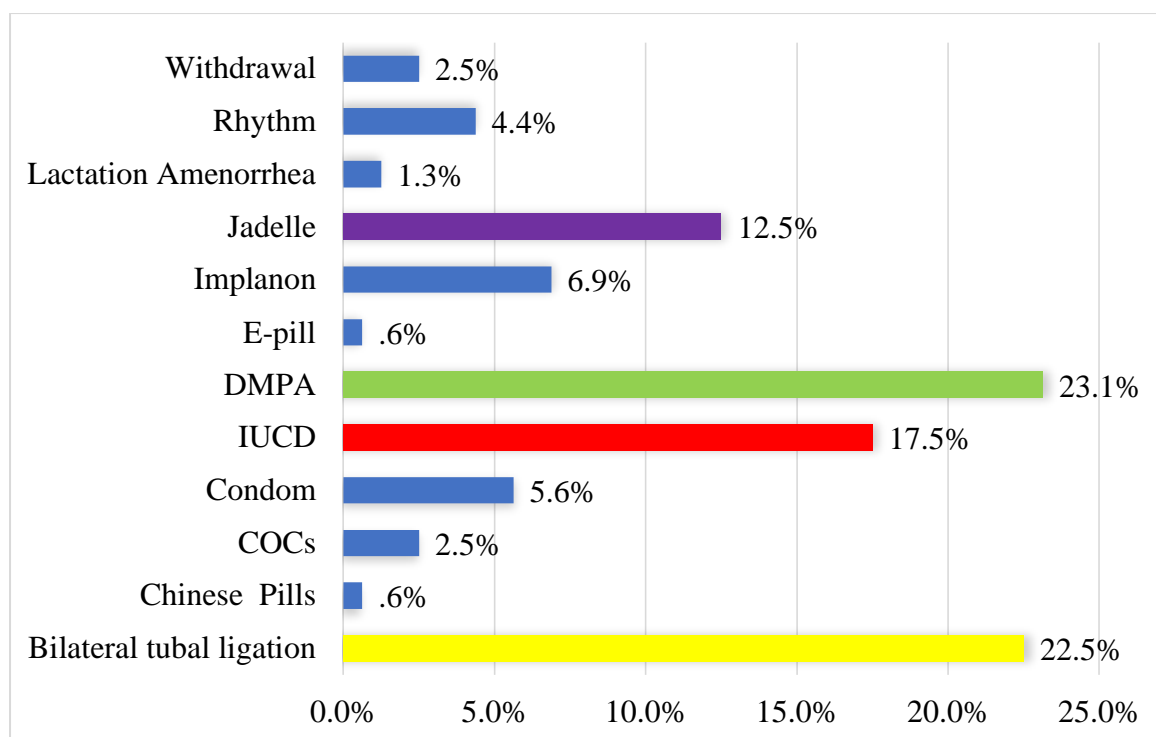


Figure 4. 2: Types of contraceptives used by women forty years or more

The most used category of contraceptives was modern (non-hormonal) contraceptives followed by the hormonal ones. Modern hormonal contraceptives were used by half of the women aged 40-44 years. However, those aged 45-49 years and 50 years, or more were mainly using non-hormonal contraceptives. Traditional contraception methods were the less utilized by women older than forty years (Table 4.4).

Table 4.5: Category of Contraception Used (stratified by age-group)

Age-groups	Modern Hormonal	Modern (Non-Hormonal)	Traditional	Other	Totals
40-44 years	50 (31.3%)	44 (27.5%)	6 (3.8%)	0	100 (62.9%)
45-49 years	18 (11.3%)	25 (15.6%)	4 (2.5%)	1 (0.6%)	48 (29.6%)
=>50 years	5 (3.1%)	6 (3.8%)	1 (0.6%)	0	12 (7.5%)
Totals	73 (45.6%)	75 (46.9%)	11 (6.9%)	1 (0.6%)	160 (100%)

Specifically, those aged 40-44 mainly used depot medroxyprogesterone acetate at 16.9%, bilateral tubal ligation (12.5%), intrauterine copper device (10%).

Among those aged 45-49 years, IUCD and BTL were used in equal proportions (6.9%) followed by DMPA at 5.6%.

One participant in this age group (45-49 years) used Chinese Herbal Pills which was classified as other contraception method. The traditional contraception methods in nearly equal proportions in both age groups; 40-44 and 45-49, were withdrawal and rhythm techniques.

Bilateral tubal ligation was the contraception of choice (3.1%) among women who were 50 years or older. This was followed by combined oral contraceptives and Jadelle (Figure 4.2).

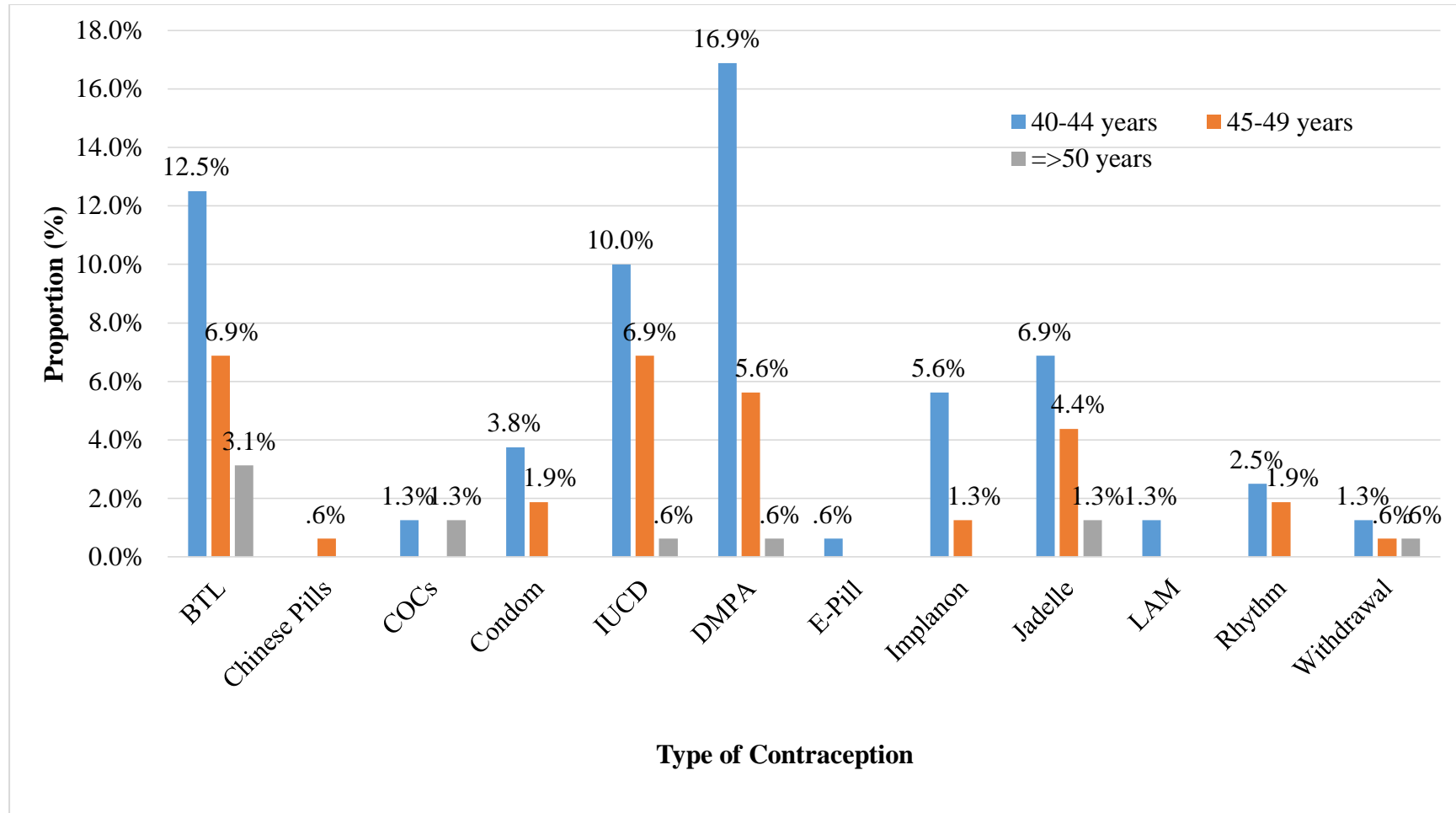


Figure 4.3: Categories of Contraceptives Used

4.5 Factors influencing contraception utilization in women aged 40 years and above at MTRH outpatient clinics.

This reports a statistically significant association between being aged 40-44 years, primary level of education, higher (multiparous and grand-multiparous) parity and the use of contraception. Women aged 40-44 years had a higher likelihood of using contraceptives compared to those aged 50 years or older (AOR=1.767; 95% CI: 0.846, 3.689; p=0.003). Being married (AOR=1.515; 95% CI: 1.107, 2.074; p=0.005) and having low parity (AOR=1.469; 95% CI: 1.168, 1.848; p=0.003) also increased the likelihood of contraceptives use. (Table 4.6).

Table 4.6: Socio demographic and Reproductive factors Promoting Contraception Use

Socio demographic and Reproductive Factor (N=160)		n (%) using FP	COR (95% CI)	AOR (95% CI)	p-value
Maternal age	40-44 years	99 (61.9%)	1.289 (0.995, 1.669)	1.243(0.900,1.718)	0.047
	45-49 years	48 (30%)	Reference	Reference	
	40-44 years ≥50 years	99 (61.9%) 13 (8.1%)	1.885 (1.161, 3.060) Reference	1.767(0.846,3.689) Reference	0.003
Formally Employed	Yes	21 (13.1%)	Reference	Reference	0.054
	No	139(86.9%)	1.110 (0.798, 1.545)	0.656(0.223,1.934)	
Marital Status	Married	99 (61.9%)	1.515 (1.107, 2.074)	1.361(0.969,1.913)	0.005
	Not Married	61 (38.1%)	Reference	Reference	
Parity	Low Parity	19 (11.9%)	Reference	Reference	0.003
	Multiparous	85 (53.1%)	1.469 (1.168, 1.848)	1.381(1.103,1.729)	
	Low parity Grand-multiparous	19 (11.9%) 55 (34.4%)	Reference 1.223 (0.997, 1.532)	Reference 0.713(0.422,1.203)	0.094
Age at First Birth	<35 years	157 (98.1%)	1.819 (0.545, 6.075)	0.475(0.404,0.559)	0.250
	≥35 years	2 (1.3%)	Reference	Reference	
Births after age 40 years	Planned (N=24)	14 (58.3%)	1.264 (0.808, 1.978)	1.203(0.585,0.476)	0.324
	Unplanned (N=52)	24(46.2%)	Reference	Reference	

4.5.1 Socio demographic and Reproductive Barriers to Contraception Use

Those professing the catholic faith were significantly ($p=0.013$) more likely (AOR=1.333; 95% CI: 1.094, 1.624) not to use contraception compared to those professing other faith. Those with primary education or less had an increased Olikelihood of contraception non-use compared to those with secondary or tertiary education (AOR=1.035; 95% CI: 0.484, 2.213; $p=0.017$). Similar findings were reported among those with a fertility desire ($p=0.003$) and premenopausal symptoms ($p<0.001$) as shown on Table 4.7.

Table 4.7: Test of Association between the participants' socio demographic and reproductive characteristics and barriers to contraceptive use.

Socio demographic and Reproductive Factors	n (%) Not using contraceptive	COR (95% CI)	AOR(95% CI)	p-value
Religion Catholic (N =60) Non-Catholics N=299	42 (70 %) 157(52.5%)	1.333 (1.094, 1.624) Reference	1.135(0.815,1.581)	0.013
Level of Education ≤Primary (N=200) ≥Secondary (N=159)	122 (61%) 77 (48.4%)	1.260 (1.036, 1.531) Reference	1.035(0.484,2.213)	0.017
Fertility Desire Yes (N=48) No (N=311)	36 (75%) 163(52.4%)	1.431 (1.178, 1.738) Reference	1.385(1.031,1.859)	0.003
Miscarriage >40 years Yes (N=25) No (N=334)	16 (64%) 183(54.8%)	1.168 (0.857, 1.592) Reference	1.285(0.753,2.191)	0.547
Pre-menopausal Symptoms (Yes = 149) No (N=210)	99 (66.4%) 100(47.6%)	1.395 (1.163, 1.674) Reference	1.143(0.829,1.575)	<0.001

4.5.2 Clinical Factors Influencing Contraception Use

Women over 40 years old had many chronic diseases but the medical illnesses that were looked into in this study were cardiovascular diseases and cancer of which these women are at great risk due to age. The proportion of those with hypertension were (12.8%; n=46), diabetes mellitus (13.4%; n=48), heart diseases (11.7%; n=48) and cancer (12.8%; n=46). Mental illness was the commonest chronic illness though not a cardiovascular disease mental illness (13.6%; n=49). The proportion using contraceptives is shown in Table 4.8.

Table 4. 8: Chronic disease and proportion using contraceptives

Chronic Disease (N)	Contraception (Yes)	COR (95% CI)	p-value
Hypertension Yes 46 (12.8%) No 333(87.2%)	26 (56.5%) Reference	1.320 (0.994, 1.754)	0.111
Diabetes Yes 48 (13.4%) No 311(86.6%)	22 (45.8%) Reference	1.033(0.741, 1.439)	0.877
Cardiac Yes 42 (11.7%) No 317(88.3)	17 (40.5%) Reference	1.084 (0.829,1.419)	0.623
Cancer Yes 46 (12.8%) No 313(87.2%)	15 (9.4%) Reference	1.515 (1.107, 2.074)	0.084

Among those with hypertension (12.8%; n=46), more than half 56.6% (n=26) were on contraceptives. The most common method used by hypertensive women on contraceptives was modern contraception 92.3% (n=24) with the rest on traditional contraception. Most (70.8%; n=17) women on modern contraception opted for non-hormonal contraceptives with more than one-quarter (29.2%) using hormonal contraceptives. Hypertensive women were significantly (p=0.013) more likely (OR=

1.621; 96% CI: 1.190, 2.208) to use modern non-hormonal contraceptives compared to hormonal contraceptives.

Diabetes was found to be present among 48 (13.4%) of the enrolled study participants. Less than half of them 22 (45.8%) were on contraceptives. Among diabetic women on contraceptives, 20 (90.9%) were on modern contraceptives with the rest on traditional contraceptives. Of those on modern contraceptives, nearly two thirds 13 (65%) were on hormonal contraceptives with the rest 7 (35%) on non-hormonal contraceptives.

Heart disease was observed in 42 (11.7%) of the women enrolled. Less than half of them 17 (40.5%) were on contraceptives, all of them on modern contraceptives. Of these, 13 (76.5%) were on non-hormonal contraceptives with the rest on hormonal contraceptives. Women with heart disease were significantly ($p=0.008$) more likely (OR=1.758; 95% CI: 1.304, 2.370) to use non-hormonal contraceptives compared to hormonal methods.

Cancer was reported by 46 (12.8%) of the study participants. Of these, 5(32.6%) were on contraceptives with the most preferred 14 (93.3%) being modern contraceptive methods. There were nearly equal proportions of hormonal 6(42.9%) and non-hormonal 8 (57.1%) contraceptives used (Table 4.8).

Hypertension and cardiac disease patients significantly utilized non-hormonal contraceptives. The diabetics used hormonal methods more, but it was not significant.

Table 4.9: Test of association between chronic disease and type of contraception

Chronic Disease	Hormonal	Non-Hormonal	p-value	Odds ratio (95% Confidence interval)
Hypertension	7 (29.2%)	17 (70.8%)	0.013	1.621 (1.190, 2.208)
Diabetes	13 (65%)	7 (35%)	0.229	1.364 (0.943,1.973)
Cardiac	4 (23.5%)	13 (76.5%)	0.008	1.758 (1.304, 2.370)
Cancer	6 (42.9%)	8 (57.1%)	0.780	1.160 (0.714, 1.885)

Table 4.10: Logistic Regression model between clinical characteristics (adjusting for socio demographic and reproductive characteristics) and use of non-hormonal contraceptives.

Clinical Characteristic	Confounder	AOR (95% CI)	p-value
Hypertension	Religion (Catholic)	1.621(1.190, 2.208)	0.022
	Age (40-44 years)	2.080 (1.506, 2.654)	0.032
	Marital Status (Married)	1.938 (1.446, 2.430)	0.001
	Parity (Multiparous)	2.113 (1.608, 2.618)	0.007
Cardiac Disease	Religion (Catholic)	1.791 (1.346, 2.382)	0.009
	Age (45-49 years)	2.111 (1.510, 2.952)	0.012
	Marital Status (Married)	1.867 (1.353, 2.576)	0.031
	Parity (Multiparous)	2.769 (2.037, 3.765)	0.001

A multivariate logistic regression was done between the hypertensive and cardiac patients who significantly used non-hormonal contraceptives and adjusted for confounders, which were the significant sociodemographic and reproductive factors. It was found that hypertensive and cardiac patients significantly utilized non-hormonal contraceptives and were not affected by socio demographic or reproductive characteristics as confounders (Table 4.10).

CHAPTER FIVE

5.0 DISCUSSION

5.1 Characteristics of the study participants

5.1.1 Socio demographic Characteristics of the Study Participants

This study enrolled 359 participant's majority (53.8%) were aged 40-44 years. This age group is lower than the mean age of 51 (4.1) years reported in a Turkish study (Şahin & Kharbouch, 2007a). Nearly two thirds (65.2%) of the study participants lived in the rural settings similar to a Kenyan study (Lunani et al., 2018) at 62.6% and two Nigerian studies where more than two-thirds (68.6%) and 63.2% respectively lived in the rural settings (Solanke, 2017b; Wusu, 2015). This is lower than those reported in Malawi and Ghana (Abdulai et al., 2020; Palamuleni, 2013). In Malawi (Palamuleni, 2013), more than two-thirds (80.2%) of the women enrolled lived in the rural settings while in the Ghanaian study (Abdulai et al., 2020) more than two-thirds live in the urban settings.

Most (72.1%) of the participants enrolled were married just like that reported in a previous Nigerian study where 71.8% were married (Wusu, 2015). However, the proportions of married women reported in Kenya (Lunani et al., 2018) at 51.6% and Botswana (32.9%) was lower than that in the current study (Ama & Olaomi, 2019). The reason for the contrast in the Botswana (Ama & Olaomi, 2019) and current studies could be difference in the limit on the age that was beyond 90 years in Botswana while the current study's oldest participant was aged 55 years. Consequently, the number of widows was higher.

More than half (55.7%) of those enrolled in this study had a primary education or less which similar to a study in Kenya (Lunani et al., 2018) at 55.2%, Nigeria (Wusu, 2015) at 59.4% but lower than that reported in Ghana (Abdulai et al., 2020) at 73.9%,

Botswana (Ama & Olaomi, 2019) at 79.1%, Malawi (Palamuleni, 2013) at 91.4% and another Nigerian (Solanke, 2017b) study at 71.6%. This could imply lower level of education among participants from Ghana and a higher age bracket of participants from Botswana who might not have advanced with their education for economic reasons.

The proportion of formally employed participants in the current study was 12% which was lower than other comparison studies from Kenya (57.4%) Ghana (20.6%), Botswana (32%), Malawi (59.3%) and two Nigerian studies at 61.7% and 77.5% (Abdulai et al., 2020; Ama & Olaomi, 2019; Lunani et al., 2018; Palamuleni, 2013; Solanke, 2017; Wusu, 2015). This difference could be attributed to the fact that majority of the enrolled women were either housewives or involved in informal means of making a livelihood.

The most professed religion in this study was the protestant faith at 82.5%. This is similar to Malawi (Palamuleni, 2013) at 83.2% but lower than a previous study in Kenya (Lunani et al., 2018) at 64.6%. In Ghanaian and Nigerian studies, the most common religious orientation was Islam at 88.8% (Abdulai et al., 2020) and 33.5% (Wusu, 2015) respectively.

5.1.2 Reproductive Characteristics of the Study Participants

Most (63%) of the women enrolled got their first child aged 20-34years. This is similar to the findings from Nigeria where more than half (53.8%) of those enrolled had their first baby when they were 20 to 34 years old (Solanke, 2017b).

Nearly half (45.4%) of this study's participants were multiparous as opposed to findings in Nigeria (Solanke, 2017b) and Malawi (Palamuleni, 2013). In Nigeria, the

most (69.4%) of the participants were grand multiparous while in Malawi 34.1% of the women had low parity.

More than half (54.7%) of the women enrolled did not desire any more children in contrast with Malawi (Palamuleni, 2013) and the United States of America (Godfrey et al., 2011) where equal proportions (58.8%) of the women enrolled still had a fertility desire.

5.2 Proportion of women over 40 years old using contraception at MTRH outpatient clinics.

This study reports that less than half 160 (44.6%) of all the participants enrolled were using contraceptives. Although this figure was higher than the contraceptive rate reported by KDHS at 37.1% in women aged 40-49 years, it is still unacceptably low (KDHS, 2014). This is because many women in this study had a chronic or comorbid disease which has adverse pregnancy outcomes. Studies in developed countries showed a high prevalence of rate contraception use despite a chronic disease with a prevalence of 89.3% in Italy and 73.7% in USA (Daniels & Abma, 2020; Nojomi et al., 2013). This is because developed countries have better health policies, economic status and behavioral factors that promote contraceptive use. The overall proportion of contraception reported in this study matches that from a study conducted in Canada where the overall proportion of contraception use among women aged 40 years or more was 40.3% (Black et al., 2009).

When contraception use was stratified by age brackets, the highest proportion (62.5%; n=100) of contraception use was among those aged 40 – 44 years, followed by 45 – 49 years (30%) with the least proportion being those older than 50 years (7.5%). This proportion of contraception among those 40 to 44 years of age is higher than that

reported in a previous Kenya Demographic Health Survey (KDHS) of 2014 (KDHS, 2014) where 48.4% of women aged 40 – 44 years used a contraceptive method. This difference could be attributed to temporal changes in trends. As the population rises, economic circumstances change and more women get sensitized, so does the proportion of contraception use. However, the KDHS study was national and this could influence the overall proportions compared to the current study which was conducted in a single center in a public national hospital. Furthermore, the proportion of contraception among women aged 40-44 years reported in this study is higher than that in Malawi where 37.5% of women in this age group were on contraceptives (Palamuleni, 2013). In contrast to this study's findings, higher proportions of contraception among women aged 40-44 years were reported in the United States of America at 75% (Daniels & Abma, 2020) and in a systematic review sanctioned by the European Society of Human Reproduction and Embryology where 66 – 90% of women aged 40-44 years were on some form of contraception (Baird et al., 2009). This difference could be attributed to socioeconomic differences in studies conducted in countries with developed economies such as the United States of America and those domiciled under the European Union where contraceptive use is both frequent and proportionately affordable.

Among women aged 45-49 years, the findings of this study are similar to those reported in studies conducted in Malawi (Palamuleni, 2013) and Kenya at 37.3% (KDHS, 2014) but lower than those from United Kingdom (Lader, 2009).

The proportion of contraception among women aged 50 years or more reported in this study is lower than that in Botswana at 25.2% (Ama & Olaomi, 2019) . Many women have reached menopause by age 50 explaining the low utilization and there is low risk of becoming pregnant. The study in Botswana captured a wider age span up to age 90

years for contraceptive use, for prevention of pregnancy and or sexually transmitted diseases.

5.3 Contraception methods used by women aged 40 years and above

Among all the women on contraceptives who participated in this study, 92.5% of them were using modern contraceptives. This compares to a Turkish demographic health survey of 2013 where 90.9% were on modern contraceptives (TDHS, 2014).

Previous studies (Shufelt & Bairey Merz, 2009) have reported that women who have contraindications for using combined hormonal contraceptives can use progestin-only contraceptives such as pills, implants and injectables. This study reports that DMPA was the most commonly (23.1%) used contraceptive by women older than 40 years. When this use was stratified by age groups, 16.9% of women aged 40-44 years used DMPA, a finding similar to that reported by demographic health surveys in both Kenya and Ethiopia at 15.3% 16.8% respectively (CSA, 2014; KDHS, 2014). These proportions for DMPA use among women aged 40-44 years are higher than those reported in the United Kingdom (Lader, 2009) and Canada (Black et al., 2009) (Black et al., 2009) at 2% and 2.4% respectively. The high DMPA use reported in this study could be attributed to its rising popularity Sub-Saharan Africa in comparison to global rates. Furthermore, its high effectiveness, convenience, relatively long duration of action and secrecy especially in women whose spouses oppose the use of contraceptives could contribute to the high usage (Sullivan et al., 2006). The low adoption of DMPA in countries with developed economies could be due to the fact that progestin injectables, pills and implants have unwanted side effects such as heavy, irregular, prolonged uterine bleeding (Bakour et al., 2017). For older women with a desire for conception, DMPA causes fertility delay which is ruinous co-existing with advanced maternal age (FSRH, 2017). The risks of DMPA use could

also outweigh its benefits in patients with uncontrolled blood pressure ($\geq 160/95$ mmHg), stroke, ischemic heart disease, vascular disease, diabetes with vascular disease and in those with multiple risk factors for cardiovascular disease (FSRH, 2017). Therefore, premenopausal women with chronic diseases and other comorbidities could use progestin implants as they are safer compared to DMPA until menopause (Bakour et al., 2017).

This study did not find any participant using levonorgestrel intrauterine device (LNG-IUD) which is in contrast with findings from United Kingdom where among women aged 40-44 years, 3% of them were on LNG-IUD compared to the 4% of those aged and 45-49 years (Lader, 2009). This lack of use in this study could be due to its high cost and unavailability in many Kenya's public hospitals. LNG-IUDs significantly reduce heavy menstrual bleeding and dysmenorrhea among perimenopausal women comparable with hysterectomy (Allen et al., 2013).

This study reports a low (1.25%) utilization rate of combined oral contraception (COCs) among women aged 40-44 and more than 50 years while none of those aged 45-49 years used COCs. These findings are consistent with findings from other demographic health surveys conducted in Ethiopia (CSA, 2014) and Nigeria (NDHS, 2019) where low rates of COC use of 2.1% and 1.4% respectively were reported among women aged 40-44 years. Lower rates of COCs use were reported in those over 45 years. However, the findings of this study and those reported in demographic health surveys in Nigeria and Ethiopia are contrary to those from Canada where 43.7% of women older than 40 years reported to have used COCs (Black et al., 2009). The clinical decision to recommend the use COC in women over 40 years of age is based on health risks and non-contraceptive benefits of this form of contraception (Cho, 2018). However, these COCs are contraindicated for women with risk for

cardiovascular disease that could be attributed to smoking, obesity, uncontrolled hypertension or diabetes (Cho, 2018). Among the women enrolled in this study, 12.8% were hypertensive, 13.4% diabetic while 11.7% had heart disease and were taking anticoagulants that are contraindicated for concomitant COCs use. Previous studies conducted in countries with developed economies have however reported improved safety and tolerability profiles of combined hormonal contraceptives (Hall & Trussell, 2012). New formulations with lower estrogen and progestin levels to reduce the risk of venous thromboembolism, the multiphasic formulations and extended cycle regimes to abate the fear of using COCs have been developed (Edelman et al., 2005; Hall & Trussell, 2012). This is because of its other non-contraceptive benefits such as protecting older women from endometrial and ovarian cancers that can be sustained for approximately 15 years even if the usage is stopped (Edelman et al., 2005). Furthermore, none of the women enrolled reported having used combined hormonal patch and vaginal ring as these are not easy to find in many public hospitals in Kenya.

Male or female sterilization is a popular method in the Western countries with 68.9% of women older than 40 years in the United States of America reporting their sterilization or that of their partners (Kelsey, 2012). Particularly, male sterilization (vasectomy) is very common in developed countries with approximately 28% of women aged 40-44 and 30% of those aged 45-49 years reporting that their male partners had undergone vasectomy in the United Kingdom (Lader, 2009). However, in demographic health surveys conducted in Kenya Nigeria and Ethiopia, none of the women older than 40 years interviewed reported that their male spouses had undergone vasectomy (CSA, 2014; KDHS, 2014; NDHS, 2019). It has been reported that many African women have a negative perception on vasectomy as it causes

impotence in their partners, it is not culturally acceptable and increases the likelihood of marital infidelity (Tamunomie et al., 2016). On the other hand, this study reports that Bilateral tubal ligation (BTL) was the second most popular contraceptive method used by 12.5% of women aged 40-44 years with a declining probability of use as the age groups advanced, with 6.9% use among those aged 45-49 years and 3.1% for women aged 50 years or more. This could be attributed to the fact that majority of the women older than 40 years had achieved their desired family size and had chronic illnesses making BTL an optimal contraceptive option. This explains the reason why the hospital data obtained from this study was almost double that previously reported in Kenya's demographic health survey at 7.1% (KDHS, 2014). However, higher prevalence of BTL was reported in the United Kingdom with 18% of women aged 40-44 and 19% of those 45-49 years opting to this form of contraception (Lader, 2009). Many countries with developed economies are utilizing sterilization to cut on population growth and improve the maternal-fetal health (Enyindah et al., 2018). Despite this increasing popularity of BTL in countries with developed economies, sterilization does not confer non-contraceptive benefits of treating vasomotor symptoms and regulating menstrual cycles that have been reported with other forms of oral contraceptives (Cho, 2018).

Copper intra uterine device (IUCD) is a non-hormonal method which can be safely used beyond age 50 or until menopause. There are no contraindications based on age and the side effect profile is minimal in older women (World Health Organisation, 2015). This study found the IUCD usage rate at 10% in women 40-44 years, 6.9% in those 45-49 years and 0.6% among the over 50s. This was double that found in KDHS at 5.2% and 2% in women aged 40-44 and 45-49 years respectively (KDHS, 2014). This is because perimenopausal women with chronic illness such as diabetes mellitus,

cardiac disease, hypertension, breast cancer and venous thromboembolism can safely use IUCD because of its minimal systemic effects (Hubacher et al., 2009). Another benefit of IUCD is that, if it is inserted in women over 40 years it can be used for an extended period until menopause is reached (FSRH, 2017).). It is also protective against endometrial cancer (Baldwin & Jensen, 2013).

The barrier methods of contraception reported in this study were male condoms which were reported by 3.8% of women aged 40-44 years and 1.9% of those 45-49 years. In Botswana, condom use was the second most popular (41%) method in women over 50 years of age old (Ama & Olaomi, 2019). Because of the low sexual intercourse frequency among older women, condoms are a good contraceptive option as it also protects them from contracting sexually transmitted infections such as human immunodeficiency virus (Linton et al., 2016). In a study conducted in the United Kingdom (Lader, 2009), 21% of women aged 40-44 and 11% of those 45-49 utilized condoms as a contraceptive method. However, in demographic health surveys conducted in Kenya and Nigeria, male condom use was not as popular among women aged 40-44 years with lower prevalence in those over 45 years of age (KDHS, 2014; NDHS, 2019). The attitude toward condom use among married couples could be negative as reported in a study conducted in Malawi where condoms were considered as intruders in the marital setup (Palamuleni, 2013).

Traditional methods such as withdrawal and rhythm were generally underutilized by women over 40 years with a 0.6-2.5% proportion of use reported in this study. When approaching menopause, menstrual cycles are irregular and there is an increase in anovulatory cycles therefore predicting cervical mucus and calendar days is a challenge (Bakour et al., 2017). On the other hand, withdrawal method requires a partner who knows accurately when to withdraw and is always compliant (FSRH,

2017). As opposed to the findings reported in this study, withdrawal was the most commonly used contraception method by older Turkish women at 38.8% while a further 18% used other traditional methods such as vaginal lavage, vaginal sponge soaked in lemon juice or cola (Şahin & Kharbouch, 2007a).

This study further reported that a single study participant used Chinese oral contraceptive pills but also presented with deep venous thrombosis. In Kenya, the Chinese oral contraception pill (trading as Sophia) is taken once in a month and has been assayed by the National Quality Control Laboratories to have very high concentration of quineestrol and levonorgestrel which could further predispose its users to venous thromboembolism (Parkin et al., 2011).

5.4 Factors influencing contraception utilization in women aged 40 years and above at MTRH outpatient clinics.

5.4.1 Socio demographic and Reproductive Factors Promoting contraception utilization in women aged 40 years and above.

Women in 40 to 44 years were significantly more likely to use contraception compared to those aged 45 to 49 year ($p=0.047$) and older than 50 years ($p=0.003$). This finding is similar to previous studies in Malawi (Palamuleni, 2013), Canada (Black et al., 2009), Congo (Izale et al., 2014), Ghana (Abdulai et al., 2020; Agyemang et al., 2019) and a survey among five countries – Burkina Faso, Ghana, Ethiopia, Kenya and Uganda - in Sub-Saharan Africa (Zimmerman et al., 2019). In this performance monitoring and accountability survey (Zimmerman et al., 2019) conducted among women living in five countries within Sub-Saharan Africa, being aged 40-44 years was significantly ($p=0.017$) associated with contraception use. Similar statistical significance was reported in country-specific cohorts in Burkina Faso ($p=0.045$), Ghana ($p=0.018$), Ethiopia ($p=0.022$), Kenya ($p=0.013$) and Uganda

($p=0.045$). Older women have reduced likelihood of pregnancy and coital frequency limiting their desire for contraception (Godfrey et al. 2011). This is contrast with developed countries such as the United Kingdom where there was high contraceptive use even in women over 45 years of age; 40-44 (75%) and 45-49 (72%). Better economies mean better education and more knowledge on contraceptives even among older women. In a study conducted in Rochester in New York, women in their forties had a low perception of being pregnant despite presenting with unplanned pregnancy (Godfrey et al. 2011). This matches with the current study's finding where 14.5% of the women enrolled reported having had unplanned pregnancy in their forties. It is recommended that women in their forties use contraception to prevent unintended pregnancies due to the increased likelihood of fetal-maternal morbidity and mortality and advanced risk of chronic comorbidities further worsening pregnancy outcomes (Allen et al., 2013).

Married women were more likely ($p=0.005$) to be on contraceptives than the non-married similar to a study in Ethiopia ($p=0.002$) (Medhanyie et al., 2017). In a study conducted in Malawi (Palamuleni, 2013), it was reported that the use of contraceptives among married women increases with the advancement in age. This peaks when women are aged between 40-44 years (Palamuleni, 2013). Couples who are married might opt to postpone conception using contraceptives, while those who are married, might be content with the number of children already born, increasing their desire for contraception (Mohammed et al., 2014; Palamuleni, 2013). Married women have a higher coital frequency compared to single women further increasing their need for contraception to either space or postpone childbirth (Asresie et al., 2020). In Botswana, women over 50 years who were married or divorced/separated

were 5 times more likely to use FP than the widowed due to reduced coitus (Ama & Olaomi, 2019)

Multiparous women had a significantly greater likelihood ($p=0.003$) of using contraceptives compared to women with low parity. This is similar to findings in Nigeria (Solanke, 2017b) and Vanga-Congo (Izale et al., 2014) where multiparous women were significantly ($p<0.001$) more likely to use contraceptives compared to women with a low parity. Women with many children have a lower desire for children, further increasing contraception uptake compared to low parity women who might still desire to conceive (Timothy Chrispinus Okech et al., 2011). In their early reproductive years, women desire to space births, however, this stops after the desired family size is achieved (Okech et al., 2011).

5.4.2 Socio demographic and Reproductive Barriers to contraception utilization among women aged 40 years and above.

Those professing the catholic faith were significantly ($p=0.013$) more not to use contraception compared to those professing other faith in this study. This study found 70% of Catholics not using contraceptives, specifically modern methods which was higher than another study in Kenya where Catholics were 28 percent less likely to use a contraceptive method than those with a different religious background such as Protestant and Muslims. The difference is in the age of women as the later study was done in women of reproductive age and this study was in older women with comorbidities. The Roman Catholic Church discourages its faithful's from using modern contraceptives as birth control measures as it promotes marriage promiscuity (Agata, 2020). They are instead encouraged to rely more on the rhythm method which is unreliable in older women due to irregular menses (Okech, 2011). In countries such as Brazil which are predominantly catholic, the church influences the government

policies, limiting contraceptive use (Gupta, 1999). Despite these measures, Catholics are still using modern contraceptives such as women of reproductive in Zambia at 47.6 percent (Lasong, 2019),

Having primary school education or less significantly increased ($p=0.017$) the likelihood of not using contraceptives compared to women with secondary or tertiary school education. In Nigeria (Solanke, 2017b), it was reported that the likelihood of contraception use significantly ($p<0.001$) increased with the advancement in the women's level of education. Lower level of education is attributed to early childbearing, large family size and reduced exposure to family planning methods (Ayoub, 2004; Ouma et al., 2015). More access to education improves the women's economic opportunities further increasing uptake of contraceptives (Ayoub, 2004). Level of education is positively associated with contraceptives use but this relationship could be influenced by culture, religion and economic status (Larsson & Stanfors, 2014).

Similar findings were reported among those with a fertility desire ($p=0.003$). Comparable with a Kenyan and Ethiopian study where 89% and 82.6% respectively of those with a fertility desire did not use contraception (Mohammed et al., 2014; Timothy Chrispinus Okech et al., 2011). The groups of women with a fertility desire were those who had not achieved the desired family size, had not started having children due to issues of infertility or are newlyweds. With intention to have children there is no need of spacing or limiting children.

Having premenopausal symptoms was significantly associated with contraceptive non-use ($p<0.001$). Premenopausal symptoms such as menstrual irregularities, vasomotor symptoms, urine incontinence, reduced libido affect the woman's

perception of conceiving, sexual frequency and eventually contraceptive use (FSRH, 2017). Combined oral contraceptives treat some of these symptoms and offer non-contraceptive benefits but many women of advanced age believe it is dangerous to take these pills (Cho, 2018). Women in this study had cardiovascular risks such as heart disease where use of combined oral contraceptives is contraindicated.

5.4.3 Chronic Diseases affecting contraception utilization among women aged 40 years and above.

The chronic diseases among women on contraception reviewed in this study were those with cardiovascular risks and cancer which were hypertension (12.8%; n=46), diabetes mellitus (13.4%; n=48), heart diseases (11.7%; n=48), lung disease and cancer (12.8%; n=46).

Among those with hypertension (12.8%; n=46), more than half 56.6% were on contraceptives. They were significantly ($p=0.013$) more likely to use modern non-hormonal contraceptives compared to hormonal contraceptives. The most common contraceptive methods used by the hypertensive women were bilateral tubal ligation and copper intra uterine device at 30.8% each. This is similar to a study in Iran where 37.8% of women over 40 years used sterilization but the 2nd popular method used was withdrawal (35.4%) which has a high failure rate (Nojomi et al., 2013). Most of these women reverted to natural methods after the diagnosis of hypertension (Nojomi et al., 2013). None of the participants used COCs as the risks outweigh the benefit of use or are contraindicated in uncontrolled hypertension (Curtis et al., 2016).

Previous studies have reported that the incidence of hypertension in non-pregnant women increases with the advancement of age with women older than 40 years having the most risk (Long et al., 2015). Women over 40 years of age are therefore

more likely to become pregnant with a pre-existing hypertension (Long et al., 2015; Mekonnen et al., 2015). For women with mild to moderate chronic hypertension, this condition may have reduced impact on their maternal wellbeing during pregnancy, but could be associated with significant perinatal mortality resulting from fetal growth restriction and placental abruption (Allen et al., 2013). Women on hormonal contraceptives such as combined oral contraceptives, there is need for a complete evaluation for obesity, hypertension, diabetes or migraine and smoking history to evaluate for suitability of use (Kailas et al., 2005; Penney, 2006). Women using progestin-only pills and have pre-existing hypertension have been noted to have an increased risk of stroke compared to hypertensive women not on this form of hormonal contraception (Kailas et al., 2005).

Diabetics were 48 (13.4%) and less than half of them 22 (45.8%) were on contraceptives. This is unacceptably low because diabetes mellitus with poor glycemic control is associated with pregnancy related complications such as increased risk of spontaneous abortion. Fetal congenital anomalies and death, maternal gestational hypertension and heart disease are also increased (Chuang et al., 2005; Mekonnen et al., 2015). This is different from studies in Michigan and Algeria where 74.8% and 89% of diabetics used contraception but almost similar to a study in Ethiopia 53.8% (Mekonnen et al., 2015). Countries with better economies use have high prevalence of contraceptive use unlike developing countries where patients with chronic disease including diabetics have better access to health care.

Two thirds of the study participants who were diabetic used hormonal contraception which were Progestin-only implants (27.2%) and DMPA (18.2%). This was unlike a study in Ethiopia on diabetics and hypertensive patients where withdrawal was the commonest method at 41.2%. Progestin only contraceptives were common with

DMPA at 39.8% and implant 14.2% (Mekonnen et al., 2015). Progestin based contraceptives are safe in diabetics until menopause similar to copper intrauterine device. Combined oral contraceptives can be used in those without macro vascular or microvascular disease or complications thus careful selection is required (Chuang et al., 2005; Nojomi et al., 2013). Concerns about bilateral tubal ligation is in those diabetics with uncontrolled sugars which can lead to poor wound healing (Afsana, 2016).

Cardiac conditions are such as rheumatic heart disease, ischemic heart disease, cardiomyopathy, pulmonary hypertension, arrhythmias and congenital heart disease (Sedlak et al., 2012) . This study observed that 42 (11.7%) of the women enrolled had a history of heart disease with less than half of them 17 (40.5%) were on contraceptives. The Global Rheumatic Heart Disease Registry (REMEDY) study, found only 3.6% of those aged 12-51 years with rheumatic heart disease used contraception (Zühlke et al., 2015). This is an extremely low prevalence. A mixed study in Uganda found a low prevalence of 14% in women aged 15-55 years with rheumatic heart disease(Chang et al., 2018). Cardiac disease has life threatening cardiac events and maternal-fetal complications thus contraceptive use is extremely vital to protect against unintended pregnancies (Malin & Wallace, 2019). In MTRH, maternal and neonatal mortality in cardiac patients was 12.2% and 12.6% respectively (Poli et al., 2020). Pregnancy is contraindicated in some cardiac diseases such as severe mitral stenosis, severe ventricular systemic dysfunction and severe coarctation (Malin & Wallace, 2019). There was a statistically significant relationship ($p=0.008$) between having heart disease and using non-hormonal contraceptive methods which were copper intrauterine device and bilateral tubal ligation at 35.3% each. Copper intrauterine contraceptive device has been demonstrated to be a safe method among

patients with heart disease, but it increases the risk of menstrual bleeding which can worsen heart disease. This makes patient monitoring of women with heart disease using copper intrauterine contraceptive device mandatory (Wilson et al., 2007).

Bilateral tubal ligation as a non-hormonal contraceptive method is performed under anesthesia (either concurrently during a caesarean section or after delivery) requires well compensated cardiac patients and should be conducted in specialized centers with experience of this population (Sedlak et al., 2012). BTL and IUCDs are also safe in cardiac patients on anticoagulation (Curtis et al., 2016) None of the patients were on COCs which is a recommendation of the British Royal College of Obstetricians and Gynecologists' Faculty of Sexual and Reproductive Healthcare (FSRH) that the use of combined hormonal contraceptives (CHCs) should be contraindicated among women with heart disease (FSRH, 2017; Hardman & Gebbie, 2014). In a cohort-study conducted in Denmark, it was reported that there was a greater likelihood for the occurrence of thrombotic stroke and heart attack among women on combined oral contraceptives compared to non-users (Lidegaard et al., 2012). The likelihood of thrombotic stroke occurrence was demonstrated to vary based on the estrogen-ethinylestradiol dose and progesterone (Hardman & Gebbie, 2014; Lidegaard et al., 2012). This finding was further validated in a systematic review (Peragallo Urrutia et al., 2013) of various evidence from clinical trials which showed a two-fold increase in the risk of thrombotic stroke for women on combined oral contraceptives. However, the transdermal patch may confer greater likelihood for stroke compared to combined oral contraceptives (Lidegaard et al., 2012; Peragallo Urrutia et al., 2013). For women with comorbidities such as diabetes, smoking and obesity, the risk of stroke is increased with the use of combined oral contraceptives (Hudsmith & Thorne, 2007). The use of combined oral contraceptives among women with heart disease increases

the risk of arterial, venous and cardiac thrombosis as was also demonstrated in a population-based study conducted in Norway (Lidegaard et al., 2012) where the risk of venous thromboembolism (VTE) increased in women using combined hormonal contraceptives compared to non-users. Non-hormonal contraceptives such as barrier methods are safe for all cardiac patients although they carry a higher likelihood (five-fold) of failure (Hudsmith & Thorne, 2007).

Cancer was reported by 46 (12.8%) of the study participants. Only a third 15 (32.6%) on contraceptives with 6 (42.9%) on hormonal and 8 (57.1%) non-hormonal methods. This was lower than the study on non-gynecological malignancies by Quinn et al where 75% were using contraceptives while Maslow et al found 76.6% (Maslow et al., 2014; Quinn et al., 2014). Contraceptive use is challenging in women with cancer with complex decisions being made before treatment, during treatment and post-treatment to avoid pregnancies (Juan Enrique Blümel & Vallejo, 2020). Quinn et al reported only 56% were counseled on contraception during cancer treatment (Quinn et al., 2014).

Most chemotherapeutic agents are teratogens and administration in the 1st trimester result in fetus with congenital anomalies (Quinn et al., 2014). Chemotherapy and radiation may reduce fertility due to ovarian failure but many cancer survivors still remain fertile thus effective contraception is required to curb unintended pregnancy (Harries et al., 2020). In general, combined oral contraceptive is contraindicated in those with active cancer and within six months post therapy because of the increased risk on venous thromboembolism (Vessey & Painter, 2006). No patient was on COCs in this study because of this risk.

In this study BTL was most commonly used at 26.7% followed by condom and Jadelle at 20% each. This was similar to findings by Quinn et al where tubal ligation was at 21.3%, barrier 25.5% and hormonal 24.5%, and intrauterine device (7.2%) (Quinn et al., 2014). Bilateral tubal ligation and copper intra uterine device are safe in patients with cancer, while levonorgestrel IUDs can be used to minimize blood loss from menses in cancer patients with anemia (Gompel et al., 2019).

5.4.4 Patient reasons for non-use of contraception among women aged 40 years and above.

Nearly half (40.5%) of the women who did not use contraception claimed that they were scared of contraception side effects. Fear of side effects as a barrier to contraception has also been cited in other studies in Africa (Abiodun et al., 2012; Asekun-Olarinmoye et al., 2013; Teye, 2013). Some of the fears previously cited include infertility, menstrual irregularities (Ikeme et al., 2005) and cancer (Ugboaja et al., 2011). Fears of weight gain or loss following contraception have also been reported in some qualitative studies (Chipeta et al., 2010; Haddad et al., 2013). Furthermore, in a review of multiple demographic health surveys from different countries within Sub-Saharan Africa (Bradley et al., 2009), fear of side effects resulting from contraception and health risks was a major barrier to contraception uptake. This fear for side effects was based on personal experience from previous users, perceptions regarding contraception, concerns that might be based on misinformation and health risks from previously using injectable or oral contraceptives and intrauterine devices (Sedgh & Hussain, 2014).

Reduced sexual activity was a common (37%) barrier common barrier to contraception as reported in this study. Loss of libido is a common symptom presenting in perimenopausal women due to endocrine changes, however its etiology

could be multifactorial. Physical fatigue, body image, physical changes in the partner and family stress could all affect a woman's sexual desire and frequency (FSRH, 2017). They could also have urogenital symptoms such as vaginal dryness and bladder syndromes that could further affect their sexual frequency and uptake of contraception. These women are often hesitant to present these symptoms to their healthcare providers which could be treated effectively with vaginal estrogens and lubricants (Lynch, 2009).

Women older than 40 years who have been married for at least five years neither on contraception nor conceived could think they have a low likelihood of getting pregnant (Godfrey et al. 2011). This perception of sub fecundity could influence the likelihood of uptake or continued use of contraception methods and the women may be at risk of getting unintended pregnancies (Mosher & Jones, 2010). In a study conducted in Canada, the fertility rate for women aged 40 to 44 years was estimated at 8.4 births per 1,000 women, while those aged 45 years or more at 0.2 births per 1,000 women (Allen et al., 2013). The age-related decline in fecundity does not provide the basis for a reliable contraception.

Women often fail to use contraception due to lack of approval from their husbands (Blackstone et al., 2017). In this study, 7.5% of the women not on contraception cited spousal refusal as a reason for not using contraceptives. In Nigeria (Nwachukwu & Obasi, 2008), women stated that they were not using modern birth control methods because their husbands did not approve of them. There is a strong influence of men on their wives' decision making pattern (Ikeme et al., 2005). This creates an imbalance of power between men and women on reproductive health decisions and especially contraception use (Beekle & McCabe, 2006; Peer et al., 2013). Women often hold low social status in the community which could affect their likelihood of

independently deciding on contraception use. This finding was also reported in Malawi where condom as a contraception method was considered by husbands as an intruder in their marriage (Chimbiri, 2007). Some communities look down upon use of modern contraceptive methods and this could lead to social stigma among the affected women (Hagan & Buxton, 2012). Furthermore, inadequate communication in the marital setting about reproductive goals and family planning could also influence contraception utilization (Ogunjuyigbe et al., 2009). Recent studies have thus recommended targeted male family planning education to improve uptake of contraceptives by couples (Ijadunola et al., 2010). This is because, rates as high as 84% for contraception disapproval have been reported among men in Ghana (Avogo & Agadjanian, 2008; Blackstone et al., 2017).

Contraception devices and medications are not easily affordable to many women living in countries within Sub-Saharan Africa whose economies are still developing (Blackstone, 2017). Despite government subsidies and those from other development partners, many hormonal and non-hormonal contraceptives (such as condoms) are often freely distributed in government hospitals (Abdul-Rahman et al., 2011). Some contraceptive devices such levonorgestrol intrauterine contraceptive device would have a high initial cost, though it would be cost-effective in the long-term (Robinson & Seiber, 2008). In addition, a negative patient-provider interaction could also affect uptake and compliance to birth control methods (Blackstone et al., 2017).

CHAPTER SIX

6.0 CONCLUSIONS, RECOMMENDATIONS AND LIMITATIONS

6.1 Conclusions

- i. Less than half (44.6%) of the study participants aged 40 years or more used contraception.
- ii. Majority of the women enrolled opted for modern non-hormonal followed by modern hormonal contraceptives. Specifically, Depot Medroxy Progesterone Acetate (DMPA) was the most commonly used contraceptive. For those with hypertension and heart disease, there was a significantly increased likelihood of using non-hormonal contraceptives.
- iii. This study identified maternal age of 40-44 years, being married and multiparous as factors significantly promoting contraception use. The significant barriers to contraception were being catholic, desire for children, premenopausal symptoms and low level of education. Women not on contraceptives cited health concern as a major reason for non-use.

6.2 Recommendations

- i. There is need improve uptake of contraceptives by women older than 40 years by healthcare practitioners by addressing barriers to contraception; and counseling those with health-related barriers about the availability of safe contraceptives.
- ii. The hospital management can lay down strategies to promote integration of contraception services during patient visits at the outpatient clinics and or referral of older women to family planning clinics to optimize contraceptive use.
- iii. A community study using mixed methods can further explore factors affecting contraceptive utilization among these women.

6.3 Study Limitations

This was a hospital-based study and its findings cannot be generalized to the entire community as most of the women enrolled had comorbidities that made them visit the hospital.

There is need for future studies conducted in communities and adopting mixed methods to assess the influence of probable contraception use confounders such as cultural and geographic factors.

Future studies could explore the knowledge on the timing of when contraceptives are no longer needed in perimenopausal women, how perimenopausal symptoms affects the quality of life, contraceptive use in perimenopausal women with unintended pregnancies, chronic illness and contraceptive use in older women and the attitude of motherhood responsibility in older age.

6.4 Strength of the study

This study contributes to the knowledge on the dynamics of contraception use among women of advanced age which is under studied. Previous studies have focused on the fetal and maternal outcomes among women of advanced maternal age without addressing the prevention options for unwanted pregnancies which is key in tackling the probability of adverse pregnancy outcomes.

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APPENDICES

Appendix I: Questionnaire

**TITLE: CHOICE AND FACTORS ASSOCIATED WITH CONTRACEPTIVE
USE AMONG WOMEN AGED 40 YEARS OR MORE AT MOI TEACHING
AND REFERRAL HOSPITAL, ELDORET - KENYA.**

Study Number __ __/__ __ __

Date: Date/Month/Year __ __/__ __/__ __ __

Hospital number

Phone Number

Alternative phone number.....

A.SOCIODEMOGRAPHIC DATA

1. Date of birth: __ __/__ __/__ __ __ __ (date/month/year)

2. Employment status

Unemployed [] Employed [] Retired []

Specify occupation.....

3. Height []M weight [] Kg BMI []Kg/M²

4. Level of education

a) Primary school []

b) Secondary school []

c) Tertiary level []

i) College/technical training college []

ii) University []

d) None []

5. Religion

- a) Roman Catholic []
- b) Protestant []
- c) Muslim []
- d) Others []

6. Marital status

- a) Married []
- b) Single []
- c) Divorced []
- d) Widow []
- e) Remarried []

7. Partnership status

- Living with partner []
- Not living with partner []

8. Partners/ husbands level of education

- a) Primary school []
- b) Secondary school []
- c) Tertiary level []
- d) None []

9. Duration of relationship

- a) ≤ 2 years []
- b) 3-5 years []
- c) >5 years []
- d) No relationship []

10. Settlement/Home.....

a) Rural []

b) Urban/Town []

11. Total number of pregnancies (parity) []

Never been pregnant [] skip to number 16

12. Total number of live children male [] female []

13. Number of births after 40 years of age []

a) Intended/planned []

b) Unintended/unplanned []

14. Number of miscarriage ≥ 40 years (pregnancy loss less than 7 months gestation) []

15. Desire for children

a) Wants more children []

b) Wants no more children []

c) Undecided []

CLINICAL DATA

16. Last menstrual period date/...../.....

17. Are you experiencing premenopausal symptoms?

A) Recent Menstrual pattern changes:

Heavy (>5 pads/day) [] Prolonged (>8 days) [] Infrequent (> 38 day cycle) []

] Frequent (< 24 day cycle) [] Light (<3 days) []

B) Vasomotor: Hot flashes [] **Nocturnal sweating** []

Psychological: Irritability [] Loss of concentration []

Sexual dysfunction: Reduced libido [] Vaginal dryness []

Others: Urine incontinence [] Skin dryness/Itchiness []

18. Any known chronic diseases by the participant.

- a) HIV/AIDs [] On treatment [] Not on treatment []
- b) Tuberculosis (pulmonary or extra pulmonary) [] On treatment [] Not on treatment []
- c) Diabetes mellitus []
- d) Cardiovascular disease

Hypertension []

- Controlled BP <140/90 mmHg []
- Uncontrolled BP 140-149/90-94 mmHg []
- BP >160/95 mmHg []

Cardiac disease []

Stroke []

Myocardial Infarction []

Others.....

e) Venous thromboembolism

- ❖ Past history []
- ❖ Current history or on anticoagulation []

f) Respiratory disease

- ❖ Asthma []
- ❖ Chronic obstructive pulmonary disease (COPD) []

g) Malignancies

Cancer of cervix []

Cancer of uterus []

Ovarian cancer []

Breast cancer []

Colon cancer []

h) Other malignancies (name).....

19. Orthopedic diseases

a. Arthritis []

b. Fracture [] location of fracture.....

20. Alcohol consumption history yes [] No []

21. History of cigarette smoking Yes [] No []

- ❖ Less than 15 sticks per day []
- ❖ 15 or more sticks per day []

CONTRACEPTION DATA

22. Current use of contraception (in the last 1 month)

Yes [] then skip to No. 25

No [] move on to No 23

23. If not using contraception what are the reasons

Fertility related reasons: Absent or minimal sexual activity []

Desires children []

Wants many children []

Cannot get pregnant because of age []

Opposition to use: Respondent opposed []

Partner/husband refusal []

Religious reasons: Prohibits use []

Method related reasons: Fear of side effects []

Health concerns []

Expensive []

Lack of access/ too far []

Past bad experience with contraception []

Interferes with body processes []

Chronic disease/ comorbid disease []

Cultural reasons-state

.....

Others

Specify.....

Don't know []

24. Future intentions of using a contraceptive for those not on a method

Intends to use []

Does not intend to use []

Don't know []

25. Type of contraception used**Modern contraceptives****Hormonal methods**

1. Combined oral contraceptives: Pills [] Transdermal patch [] Vaginal ring []
2. Progestin only pills []
3. Progestin implants :Implanon (3 years) [] Jadelle (5 years) []
4. DMPA{Depoprovera}(3 monthly injections) []
5. Levonorgestrel intra uterine devices []
6. Emergency contraception []

Non-hormonal

1. Copper intra uterine devices []
2. Bilateral tubal ligation []
3. Vasectomy of partner or husband []
4. Lactational amenorrhoea []
5. Condom male [] Female []

Traditional methods

- a) Rhythm calendar method (safe days method) []
- b) Withdrawal []
- c) Post sex douching []
- d) Other methods, specify.....

26. Any Side effects of the specific contraceptive being experienced

- a) Heavy/infrequent/prolonged menses/absent []
- b) Weight gain []
- c) Reduced libido []
- d) Headache/dizziness []
- e) Menstrual cramps []
- f) Mood changes []
- g) Breast tenderness []
- h) Others. Specify.....

27. Where was the contraception given

Government facility: Public hospital []

Private hospital []

Pharmacy []

28. Partner/husband supports the use of contraception Yes [] No []

29. The partner/husband decides which contraception is to be used

Yes [] No []

30. History of discontinuation of contraception in the last 1 year Yes [] No

[]

31. Reasons for discontinuation.

- a. Side effects []
- b. Health concern []
- c. Wanted to become pregnant []
- d. Difficult to get pregnant []
- e. Wanted a more effective method []
- f. Lack of access []

- g. It is expensive []
- h. Menopausal []
- i. Experiencing premenopausal symptoms []
- j. Husband/ partner away []
- k. It is up to God []
- l. Absent or minimal sexual activity []
- m. Advanced age []
- n. Religious reasons []
- o. Partner/husband refusal []
- p. Sees no need []
- q. Comorbid/Chronic disease []

32. Others Specify.....

Other contraceptive methods used in the last 3 years

Name

33. Patient's perception on risk of getting pregnant in the older age.

- ❖ It is possible to be pregnant []
- ❖ Cannot get pregnant []
- ❖ I don't know if pregnancy can occur []

34. Use of hormone replacement therapy Yes [] No []

- ❖ If yes, is it combined with a contraception method []
- ❖ Without a contraception []

35. Have you been educated on contraceptive need in this age group, choice or side effects of contraceptives by a medical provider Yes [] No []

If yes, by who? Community health worker [] Nurse [] Doctor []

36. Ideas on when to bring the contraception used to an end

- ❖ Don't know []
- ❖ When menses stop immediately []
- ❖ When experiencing premenopausal symptoms: e. g hot flashes
[]
- ❖ 1 year after menses stop []
- ❖ Other
reasons.....
.....

37. Sexual activity in the last 3 months.

- a) Not having sex []
- b) Infrequent sex []
- c) Frequent sex []

Appendix II: Consent Form

RESEARCH TOPIC: CHOICE AND FACTORS ASSOCIATED WITH
CONTRACEPTIVE USE AMONG WOMEN AGED 40 YEARS OR MORE AT
MOI TEACHING AND REFERRAL HOSPITAL, ELDORET - KENYA.

Investigator: DR BEATRICE JEPKEMOI CHESIRE

MOBILE NO: 0722696004

I.....of P.O Box.....

Tel.....hereby give informed consent to participate in this
study at Moi Teaching and Referral Hospital. The study has been explained to me
clearly by Dr. Beatrice Chesire (or her appointed assistant) of P.O. Box 5944 Eldoret.

I have understood that by participating in this study, I shall volunteer information
regarding my illness and other comorbidities. I am aware that I can withdraw from
this study at any time. I have also been assured that all information shall be treated
and managed in confidence. I have not been induced or coerced by the investigator (or
his appointed assistant) to cause my signature to be appended in this form and by
extension participate in this study.

Initials of participant.....

Signature.....

Date.....

Name of witness.....

Signature.....

Date.....

Appendix 11I: Kiswahili: Fomu Ya Kibali

**MADA YA UTAFITI: CHOICE AND FACTORS ASSOCIATED WITH
CONTRACEPTIVE USE AMONG WOMEN AGED 40 YEARS OR MORE AT
MOI TEACHING AND REFERRAL HOSPITAL, ELDORET - KENYA.**

MTAFITI - DR BEATRICE JEPKEMOI CHESIRE

RUNUNU: 0722696004

Mimi _____ wa Sanduku la Posta
_____, Nambari ya Simu_____

najitolea kwa hiari yangu mwenyewe kutoa kibali cha kujihusisha katika utafiti uliotajwa hapo juu unaendelezwa katika hospitali ya Moi Teaching and Referral Hospital. Nimepokea maelezo ya tafsili kuhusu utafiti huu kutoka kwa Daktari Beatrice Chesire (au mtafiti msaidizi wake) katika lugha, kanuni na masharti ninayoelewa vyema. Nimehakikishiwa kuwa, sitadhurika kamwe kutokana na kujihusisha kwangu katika utafiti huu. Ilibainishwa kuwa kujihusisha katika utafiti huu ni kwa hiari na nina uhuru wa kujiondoa wakati wowote ule bila ya kuhujumiwa. Zaidi ya hayo, nilihakikishiwa kuwa, kanununi zote za maadili ya utabibu, uhuru, haki, na manufaa zitazingatiwa katika utafiti huu.

Jina la Mhojiwa _____

Sahihi _____

Tarehe _____

Jina la shahidi _____

Sahihi _____

Tarehe _____

Appendix V: English: Introductory Letter

I am Dr Beatrice Jepkemoi Chesire, a medical doctor currently pursuing my Master's Degree in Reproductive Health at Moi University, College of Health Sciences. I am conducting a study entitled: CHOICE AND FACTORS ASSOCIATED WITH CONTRACEPTIVE USE AMONG WOMEN AGED 40 YEARS OR MORE AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET - KENYA.

You are being asked to take part in the research study concerning the topic above. Information on the study and your participation is detailed below. Please read this form carefully. You are free to ask any question during any time of the study. If you decide to participate in the study, you will be given a copy of this introductory letter and the consent form for your records.

Taking part in the study is voluntary. If you accept to enroll in the study, you will be free to terminate your participation at any time.

The purpose of this study is to find out the contraceptive use, the choice of contraception and factors affecting choice and utilization. The process of your participation will involve answering of questions related to contraception use.

The information you provide will be kept confidential at all times and there will be no use of identifiers that may trace back to you.

For more information concerning your rights as a research participant, you may contact the Moi University/MTRH Institutional Research Ethics Committee (IREC) on telephone number 053 – 33471 ext. 3008.

Yours faithful,

Dr Beatrice Jepkemoi Chesire

P.O. Box 5944

Eldoret

Mobile No: 0722696004

Appendix VI: Barua Ya Utangulizi

Mimi ni daktari Beatrice Jepkemoi Chesire Nimehitimu kama daktari na nimesajiliwa na Bodi ya Madaktari ya Kenya. Kwa sasa, ninasomea shahada ya juu (masters) ya udaktari wa Afya ya Uzazi katika Chuo Kikuu cha Moi. Ninafanya utafiti kuhusu: **CHOICE AND FACTORS ASSOCIATED WITH CONTRACEPTIVE USE AMONG WOMEN AGED 40 YEARS OR MORE AT MOI TEACHING AND REFERRAL HOSPITAL, ELDORET - KENYA.**

Ninaomba ujiunge na utafiti huu. Maelezo yafuatayo yanahusu utafiti wangu. Ningependa usomee na iwapo unamaswali yoyote kwa sasa ua baadaye kuwa huru kuuliza.

Kujiunga kwako ni kwa hiari. Kutojiunga hakutaathiri matibabu yako. Una huru wa kujiondoa kutoka kwa utafiti huu wakati wowote. Iwapo kutatokea maelezo zaidi kuhusu utafiti huu tutakueleza na utapata fursa ya kuamua iwapo ungependa kuendelea na kujihusisha na utafiti huu. Kuhusishwa kwako ni kujibu maswali utakaoulizwa. Maelezo yote utakayotoa yatahifadhiwa vyema na kwa njia ya siri. Pia, hatutatumia maelezo yoyote ambayo yanawezesha kukufahamisha.

Iwapo utahitaji maelezo zaidi, waweza kuwasiliana na kikundi kinachoangazia utafiti na usawa wake wa IREC katika nambari ya rununu 053 – 33471 (ext 3008)

Mimi wako mwaminifu,

Daktari Beatrice J Chesire

SLP 5944 Eldoret

Nambari ya Rununu 0722696004

Appendix VI1: Medical Eligibility Criteria for the use of Contraceptive in Women ≥ 40 years (FSRH, 2017; World Health Organisation, 2015)

METHOD OF CONTRACEPTION	AGE GROUP(YEARS)	MEDICAL ELIGIBILITY CRITERIA (CATEGORY)
Estrogen-containing method	≥ 40	No restriction (1)
Progestin-only pill	≥ 40	No restriction (1)
Progestin implant	≥ 40	No restriction (1)
DMPA	≥ 40 to 45 >45	No restriction (1) Benefits outweigh the risks (2)
Copper IUD	≥ 40	No restriction (1)
Levonorgestrel-releasing IUD	≥ 40	No restriction (1)

Appendix VIII: WHO 2015 Medical Eligibility Criteria for the use of progestin-only contraceptive methods, by characteristic or medical Condition (World Health Organisation, 2015)

I: INDUCTION C: CONTINUATION

CHARACTERISTIC/ CONDITION	PROGESTIN- ONLY PILL	DMPA/NET- EN	IMPLANT	LNG-IUD
Smoking at age \geq 35 years	1	1	1	1
Obesity > 30 kg/m ² BMI	1	1	1	1
Adequately controlled BP	1	2	1	1
Hypertension - Systolic > 140–159 mm Hg or diastolic > 90–94 mm Hg	1	2	1	1
Hypertension - Systolic \geq 160 mm Hg or diastolic \geq 95 mm Hg	2	3	2	2
Vascular disease	2	3	2	2
Diabetes - No vascular disease	2	2	2	2
Diabetes - Vascular disease or duration of diabetes > 20 years	2	3	2	2
Stroke	I: 2 C:3	3	I: 2 C3	2
Current or past ischemic heart disease	I: 2 C: 3	3	I: 2 C3	I: 2 C: 3
Multiple risk factors for cardiovascular disease†	2	3	2	2

Appendix IX: Medical eligibility criteria for the use of estrogen containing Contraceptive methods, by characteristic or medical condition (World Health Organisation, 2015)

Obesity	
BMI ≥ 30	2
Hypertension	
Controlled hypertension	3
Elevated blood pressure	
Systolic > 140–159 mm Hg or	3
diastolic > 90–94 mm Hg	
Systolic ≥ 160 mm Hg or	4
diastolic ≥ 95 mm Hg	
History of high BP in pregnancy but now normal	2
Vascular disease	4
Diabetes	
No vascular disease	2
Vascular disease or duration of diabetes > 20 years	3/4 -based on severity
History of gestational diabetes	2
Stroke	4
Current or past ischemic heart disease	4
Multiple risk factors for cardiovascular disease†	3/4 -based on severity

Appendix X: Summary of Non-Contraceptive Benefits of Contraception in Women Over 40 Years (Allen et al., 2013)

METHOD	BENEFITS
Copper IUD	Reduces risk of endometrial cancer
Levonorgestrel-releasing IUD	Reduces heavy menstrual bleeding
DMPA	Reduces heavy menstrual bleeding, vasomotor symptoms, risk of endometrial and ovarian cancers
Estrogen-containing oral contraceptive	Reduces heavy menstrual bleeding, bone loss, vasomotor symptoms and risk of ovarian, endometrial and possibly colorectal cancers
Female sterilization	Reduces risk of ovarian cancer
Condom	Prevents sexually transmitted infections

Appendix XI: Advice on stoppage of contraception (FSRH, 2017; World Health Organisation, 2015).

CONTRACEPTION METHOD	AGE <50 YEAR	AGE ≥50 YEARS
Non-hormonal contraception	Stop contraception after 2 years of amenorrhea	Stop after 1 year of amenorrhea
Combined Hormonal contraceptives	Can be continued up to age 50 years	Stop CHC at age 50 years and switch to a non-hormonal or progestogen-only method, then stop after 1 year of amenorrhea
Depo Medroxy Progesterone Acetate (DMPA)	Can be continued up to age 50 years	Stop DMPA at age 50 years and choose from options below: Switch to a non-hormonal method and stop after 2 years of amenorrhea OR Switch to the POP, implant or LNG-IUS OR Implant Can be continued to age 50 years or continue method POP, implant or LNG-IUS and follow advice below.
Progestin-only methods (pill, implant, injection)	Can be continued till age 55 years	Can be continued till age 55 years, Or switch to a non-hormonal method and stop after 1 year of amenorrhea
Levonorgestrel intrauterine services (LNG-IUS)	Can be continued for 50 years or more	Continue method LNG-IUS If amenorrhoeic either check FSH levels and stop method after 1 year if serum FSH is ≥30 IU/L on two occasions 6 weeks apart OR Stop at age 55 years when natural loss of fertility can be assumed for most women OR If not amenorrhoeic, investigate any abnormal bleeding patterns, and continue contraception beyond age 55 years until amenorrhoeic for 1 year

Appendix XII: Time Schedule

ACTIVITY	START	COMPLETE
Proposal Concept Development	June 2016	December 2016
Proposal Writing	January 2017	February 2017
IREC Approval	March 2017	January 2018
Proposal Amendments /change of supervisor	March 2019	December 2019
Data Collection	January 2020	December 2020
Data Analysis	January 2021	February 2021
Thesis Writing	March 2021	June 2021
Thesis Defence	October 2021	November 2021

Appendix XIII: Budget

Item	Quantity	Unit price (KSh)	Total (KSh)
Laptop	1	50,000	50,000
Stationery	-	-	20,000
Printing proposals, questionnaires and final report	-	@3	25,000
Research assistants	3	2500/month for 1 year	90,000
Internet bundles	12GB/month	1000	20,000
Data management and analysis	-	-	50,000
Grand total			225,000

Appendix XIV: IREC Approval



MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

Reference IREC/2017/237
Approval Number: 0002063

Dr. Beatrice Jepkemoi Chesire,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET-KENYA.

Dear Dr. Chesire,

RE: APPROVAL OF AMENDMENT

The Institutional Research and Ethics Committee has reviewed the amendment made to your proposal titled:-

"Contraception in Women Aged 40 Years and Above at Moi Teaching and Referral Hospital, Eldoret, Kenya".

We note that you are seeking to make amendments as follows:-

- a) To change one of the supervisors.
- b) In methodology;
 - The sample size is adjusted from 385 to 424: 359
 - The outpatient clinics have been stratified into 5 departments namely; internal medicine, surgery, obstetrics and gynaecology, oncology and psychiatry from an initial number of 3 departments. Within each strata the number of clinics has increased.

The amendments have been approved on 14th January, 2020 according to SOP's of IREC. You are therefore permitted to continue with your research.

You are required to submit progress(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change(s) or amendment(s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

PROF. E. WERE
CHAIRMAN

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE



MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET
Tel: 33471/2/3
14th January, 2020





MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 33471/2/3

Reference: IREC/2017/237
Approval Number: 0002063

Dr. Beatrice Jepkemol Chesire,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET-KENYA.

Dear Dr. Chesire,

RE: CONTINUING APPROVAL

The Institutional Research and Ethics Committee has reviewed your request for continuing approval to your study titled:-

"Contraception in Women Aged 40 Years and Above at Moi Teaching and Referral Hospital, Eldoret, Kenya".

Your proposal has been granted a Continuing Approval with effect from 1st March, 2020. You are therefore permitted to continue with your study.

Note that this approval is for 1 year; it will thus expire on 28th February, 2021. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

DR. S. NYABERA
DEPUTY-CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc: CEO - MTRH
Principal - CHS
Dean - SOM
Dean - SPH
Dean - SOD



MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET
Tel: 33471/2/3
1st March, 2020





MOI TEACHING AND REFERRAL HOSPITAL
P.O. BOX 3
ELDORET
Tel: 334711/2/3

INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE (IREC)

MOI UNIVERSITY
COLLEGE OF HEALTH SCIENCES
P.O. BOX 4606
ELDORET

Reference: IREC/2017/237
Approval Number: 0002063

1st March, 2018

Dr. Beatrice Jepkemoi Chesire,
Moi University,
School of Medicine,
P.O. Box 4606-30100,
ELDORET-KENYA.



Dear Dr. Chesire,

RE: FORMAL APPROVAL

The Institutional Research and Ethics Committee has reviewed your research proposal titled:-

"Contraception in Women Aged 40 Years and Above at Moi Teaching and Referral Hospital, Eldoret, Kenya".

Your proposal has been granted a Formal Approval Number: **FAN: IREC 2063** on 1st March, 2018. You are therefore permitted to begin your investigations.

Note that this approval is for 1 year; it will thus expire on 28th February, 2019. If it is necessary to continue with this research beyond the expiry date, a request for continuation should be made in writing to IREC Secretariat two months prior to the expiry date.

You are required to submit progress report(s) regularly as dictated by your proposal. Furthermore, you must notify the Committee of any proposal change (s) or amendment (s), serious or unexpected outcomes related to the conduct of the study, or study termination for any reason. The Committee expects to receive a final report at the end of the study.

Sincerely,

PROF. E. WERE
CHAIRMAN
INSTITUTIONAL RESEARCH AND ETHICS COMMITTEE

cc CEO - MTRH Dean - SOP
Principal - CHS Dean - SON
Dean - SOM
Dean - SOD

Appendix XV: Hospital Approval MTRH



An ISO 9001:2015 Certified Hospital



IREC/2017/237

MOI TEACHING AND REFERRAL HOSPITAL

Telephone: (+254)053-2033471/2/3/4
 Mobile: 722-201277/0722-209795/0734-600461/0734-683361
 Fax: 053-2061749
 Email: ceo@mtrh.go.ke/directorsoffice@mtrh@gmail.com

Nandi Road
 P.O. Box 3 – 30100
 ELDORET, KENYA

Ref: ELD/MTRH/R&P/10/2/V.2/2010

8th March, 2018

Dr. Beatrice Jepkemoi Chesire
 Moi University,
 School of Medicine,
 P.O. Box 4606-30100,
ELDORET-KENYA.

APPROVAL TO CONDUCT RESEARCH AT MTRH

Upon obtaining approval from the Institutional Research and Ethics Committee (IREC) to conduct your research proposal titled:-

"Contraception in Women Aged 40 Years and Above at Moi Teaching and Referral Hospital, Eldoret, Kenya".

You are hereby permitted to commence your investigation at Moi Teaching and Referral Hospital.

Wilson K. Aruasa
 DR. WILSON K. ARUASA, MBS
 CHIEF EXECUTIVE OFFICER
 MOI TEACHING AND REFERRAL HOSPITAL



- cc
- DCEO, (CS)
 - Director of Nursing Services (DNS)
 - HOD, HRISM

All correspondence should be addressed to the Chief Executive Officer
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