THE IMPACT OF AN EDUCATIONAL INTERVENTION ON THE KNOWLEDGE OF BILATERAL TUBAL LIGATION AMONG WOMEN ATTENDING ANTENATAL AND FAMILY PLANNING CLINICS IN BOMET COUNTY: AN INTERVENTIONAL STUDY

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A Thesis Submitted to the Institute of Postgraduate Studies of Kabarak University in Partial Fulfillment of the Requirements for the Award of Master of Medicine in Family Medicine

KABARAK UNIVERSITY

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The research thesis entitled "**The Impact of an Educational Intervention on the Knowledge of Bilateral Tubal Ligation (BTL) among Women Attending Antenatal and Family Planning Clinics in Bomet County: An Interventional Study**" written by **Wangui Ngigi Lydiah** is presented to the Institute of Postgraduate Studies of Kabarak University. We have reviewed the research thesis and recommend it be accepted in partial fulfilment of the requirement for the award of the degree of Master Medicine in Family Medicine.

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ABSTRACT

Bilateral Tubal Ligation (BTL) is a highly effective contraceptive method with more than 99% effectiveness at preventing pregnancy. Its uptake remains low in Sub-Saharan Africa at 1.6%. The Kenya Health and Demographics Survey (KHDS) 2014, indicated that almost half of the married women did not desire further childbearing but with low utilization of permanent contraceptive methods (BTL). This gap highly contributes to rising numbers of unintended pregnancies and subsequent rise in maternal deaths, risk of abortions, and its associated complications. The low acceptance of BTL as a method of contraception in this region has been attributed to a lack of knowledge, cultural and religious misconceptions. This study aimed to determine the level of knowledge about BTL at baseline and the impact of an educational intervention among women attending ANC/Family planning clinics at Tenwek and Longisa Hospitals in Bomet County. A quasi-experimental study design was used. Demographic characteristics, knowledge of BTL, perceived risks, and benefits were assessed at baseline and post-intervention. A difference measure was used to assess the impact of the intervention at 95% CI, with a p-value of 0.05 considered significant. The data was analysed using STATA version 18.Eighty (80) women were targeted in each of the phases. The selection was through simple random sampling. A pre-designed, pre-tested, and semi-structured questionnaire was utilized. Student's t-test was used to compare knowledge scores for participants in the pre and post-interventional phases.The mean age of the participants at baseline and post-intervention was 29.0±5.8 years and 29.2±5.6 years, respectively. Overall, 62% of participants said they would choose BTL, with 52% in the post-intervention arm.The knowledge assessment results showed that participants with postsecondary education had higher average knowledge scores (4.1 out of 6) than those without postsecondary education (3.5 out of 6), with a significant difference (p-value=0.02). For knowledge scores, forty-three per cent (43%) of women had a poor knowledge score in the pre-intervention phase and fifty-six per cent (56%) in the post-intervention phase. Fifty-four per cent (54%) of women had a moderate score in the baseline survey, and forty-five per cent (45%) followed the intervention. For the women with good knowledge scores, forty-six per cent (46%) were in the post-interventional phase with fifty-three per cent (53%) in the baseline survey. The measure of effect on educational intervention showed no significant difference between pre-and post-intervention scores.In general, lower knowledge scores were obtained in the post-intervention arm, implying that the educational intervention provided did not influence participants' knowledge of BTL. There was no statistically significant difference in the participants' knowledge levels at baseline and post-intervention [3.3 (-3.2 to 9.9); p-value=0.3].Educating families, particularly women of childbearing age, about alternative family planning methods would increase uptake, allowing families to achieve desired family sizes while limiting the impact of unwanted pregnancies and maintaining a healthy population.

Keywords:*Bilateral Tubal Ligation, Contraceptive methods, Family planning services, Health Education, Sterilization, Unwanted pregnancies*

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ABBREVIATIONS AND ACRONYMS

ACOG	American College of Obstetrics and Gynecologists
ANC	Antenatal Care
ANOVA	Analysis of variance
BTL	Bilateral Tubal Ligation
CREST	Collaborative Review of Sterilization
HIV	Human Immuno-Deficiency Virus
IUD	Intrauterine Device
IREC	Institutional Research and Ethics Committee
KES	Kenya Shillings
KHDS	Kenya Health and Demographics Survey
MCH	Mother and Child Health
MOH	Ministry of Health
NACOSTI	National Commission of Science Technology and Innovation
SDGs	Sustainable Development Goals
SPSS	Statistical Package for the Social Sciences
STI	Sexually Transmitted Infections

OPERATIONAL DEFINITION OF TERMS

Educational Intervention: Comprises use of a guided chart and pamphlets to give facts on actual risks and benefits of bilateral tubal ligation

Women: Adult pre-menopausal women seeking reproductive care services

Bilateral Tubal Ligation (BTL): A method of family planning that is considered permanent, with options for reversal although with no guarantee. There are surgical and non-surgical techniques

Uptake of BTL: The percentage utilization of BTL as a method of contraception

Contraception: Is a general term used to describe all methods to prevent pregnancy

Desired Fertility: This is a term used to refer to the woman's desire to have children in the future. It is thought to correlate with the number of living children and a woman's age.

Modern Methods of contraception: They include female sterilization, male sterilization, the pill, intra-uterine devices [IUDs], injectable, implants, male condoms, female condoms, location alamenorrhea, emergency contraception, Calendar (rhythm), ovulation prediction, cervical mucus and temperature monitoring

Unmet need: is the sum of the unmet need for spacing plus the unmet need for limiting pregnancy

CHAPTER ONE

INTRODUCTION

1.1 Overview

This chapter will seek to explain the importance of family planning in general and the various methods available as well as an in-depth discussion on the benefits of permanent contraception in women who have finished childbearing. The chapter will also highlight how the permanent method of contraception is crucial to the achievement of the Sustainable Development Goals. Curbing overpopulation is key to achieving the first five SDGs that seek to eradicate poverty, end hunger and achieve food security. Additionally, attaining good health and well-being alongside ensuring quality education and promoting gender equality are pre-requisite (Assembly, 2015).

1.2 Background to the Study

The World Health Organization (WHO) defines family planning as the ability of individuals and couples to foresee and achieve their desired number of children as well as the spacing and timing of their births. This is accomplished by the use of various methods, which include the use of combined oral contraceptive pills, injectable, implants, intrauterine devices and permanent contraception (ACOG Practice Bulletin, 2019). The latter could either be male or female sterilization. Examples of permanent contraceptive methods include Bilateral Tubal Ligation (BTL), hysteroscopy tubal occlusion and vasectomy.

The permanent methods are mostly utilized by women who have achieved their desired family size. It is achieved by disruption of the fallopian tubes, which can be done laparoscopically, or by use of a mini laparotomy. Timing for application of this procedure could be soon after delivery, or as an interval procedure, that is, after the

puerperium (ACOG Practice Bulletin, 2019). The mini-laparotomy is a safe procedure with minimal risks involved and also can be done in a low-resource setting given that it only requires basic surgical equipment. Randomized control trials have not shown statistically significant differences in morbidity between women who underwent tubal occlusion procedures laparoscopically as opposed to the mini-laparotomy. In addition, any higher morbidity associated with the mini-laparotomy at the point of caesarean delivery is attributable to the primary indication for the caesarean section (ACOG Practice Bulletin, 2019)

Women who decide to proceed with the permanent contraceptive method will need to undergo counselling to allow an informed decision and consent. A study by Eln (2020), found that women in Sweden expressed a lack of counselling by healthcare providers and that it was until they implied the need for tubal ligation that the procedure would be provided. The women in this study acknowledged that it would have been easier to arrive at a decision sooner, had counselling been offered at their previous reproductive health clinic encounters. Counselling on BTL involves a comprehensive dialogue between the clinician and the patient. This should be done in a way and manner that offers the patient autonomy and should be in a time that is enough to allow for thoughtful deliberations by the patient (Baill, 2013). Information that is useful for this category of women includes the comparable failure rate with that of long-term reversible methods such as the IUD, at 0.2 to 0.8% (ACOG Practice Bulletin, 2019). The U.S. Collaborative Review of Sterilization (CREST), a landmark prospective multicenter observational study on the use of BTL reported that the 10-year cumulative failure rate for sterilization was 1.85% in 10685 women. This was noted to be higher than previously reported and was attributed to the fact that most procedures done were interval procedures performed under challenging surgical circumstances. Additionally,

sterilization was seen to reduce the overall risk of ectopic pregnancy. However, if the pregnancy was to occur post-sterilization, it was highly likely to be ectopic (ACOG Practice Bulletin, 2019).

Worldwide, female sterilization is utilized by more than 20% of couples and is the leading method of contraception for women in high-income countries (WHO, 2003). Notably, before the 1960s, Bilateral Tubal Ligation (BTL), was only done for medical reasons, in which further pregnancies posed a health risk to the woman. Later in the same decade, a cultural climatic change led to women desiring to limit their family sizes, and further, safe surgical approaches resulted. Insurance coverage of the same catapulted its utilization in the United States

Though there is an increasing uptake of female sterilization in sub-Saharan Africa, its uptake is still comparatively very low. As of 2003, the highest prevalence of female sterilization was in Puerto Rico at 48.7% (Lunde, Rankin, Harwood, & Chavez, 2013). A study of Puerto Rican women indicated that female sterilization was the dominant method of contraception and that women who were not sterilized were unlikely to use any other method of contraception. One of the major factors cited for the widespread utilization of sterilization in Puerto Rico was a need for career establishment and improvement of socioeconomic status. A further review in recent times has established that the large-scale sterilization in the small island of Puerto Rico was a result of obstetric violence by colonial masters for a cheap and consistent workforce (Lunde et al., 2013). A few countries in the world still prohibit the utilization of female sterilization for reasons not medically indicated, while others have restrictions to the lowest age allowed for a woman to be sterilized, such include Japan and Mongolia. Reasons for such restrictions are not well established in the literature. The prevalence of female sterilization in Sub-Saharan Africa stands at 1.7% (E.Ezeanoluefg, 2019) in a

region with an exponentially growing population and a high rate of maternal deaths. There is a known unmet contraceptive need in about 21% of women in this region, contributing to about 38% of unwanted pregnancies (E.Ezeanoluefg, 2019).

Family planning is a pillar of safe motherhood and has been shown to avert about 230 million unwanted pregnancies (Ahmed et al., 2012). It is thus a primary strategy in the prevention of unwanted pregnancies and abortions hence reducing complications that could lead to an increase in maternal mortality. The use of effective family planning is crucial in the developing world where 99% of all maternal deaths occur (Ahmed et al., 2012). In addition, non-contraceptive benefits of family planning include improvement in maternal health and reduction of infant mortality rates, all of which are determinants in the achievement of Sustainable Development Goals.

In Africa and Kenya in particular, the population policy found its light after the population policy declaration of 1988. Several attempts have been introduced to curb the rising population with minimal success, leading to the initiation of the National family planning programme in Kenya to slow down the exponentially growing population that undermines health, education, access to food and housing. In its strategies, the government of Kenya aims at reducing the total fertility rate from 4.6 in 2009 to 2.6 in the year 2030. The Kenya Health and Demographics survey in 2014 assessed the knowledge of women regarding various contraceptive methods. Results from this survey showed that women had more knowledge regarding modern contraceptive methods, top on the list being the male condom, followed by injectables and the pill. The prevalence uptake of BTL from the 2008-2009 survey was at 4.8%, and dropped to 3.2% in the most recent survey, while that of injectables was 21.6% to 26.4%. In this survey, more than 50% of women aged 15-49 years of age who were married expressed a need to stop childbearing. Most women surveyed indicated knowledge of at least one method of

contraception but with no percentage breakdown on the knowledge level of the individual methods of contraception available. Knowledge is an important pre-requisite to any decision making and a lack of it highly reflects in the low utilization of a method, in this case BTL. A study by Kinuthia, 2013, in central and eastern Kenya showed a high knowledge level of BTL, but did not reflect with a high utilization of the same. Perceived side effects, and cultural and religious beliefs played a role in deterring its uptake. The high level of knowledge would have also been contributed to by the population selection of the study as it included women who expressed a need to stop childbearing. Additionally, the knowledge depicted might have been an awareness of the method, devoid of factual knowledge.

More than 96% of women have contact with a skilled health worker at least once in the course of their pregnancy (KDHS, 2014). It is during these opportunities that health workers can educate women on the various methods available for contraception. Early conversations regarding contraception allow time for deliberation with self and even with the significant other to allow for an amicable decision to be arrived at by the time the woman returns for delivery. Most women who have undergone BTL at one of the facilities have decided at the point of admission for delivery, and this was prompted by a question from the health care provider who may have identified a reason, possibly due to multi-parity, multiple repeat caesarean deliveries or even an underlying health condition that would risk the woman's life. Usually, there is hesitation on the women's side concerning this decision with a majority requesting to wait for their husbands to aid in decision making. Women should be offered information regarding all available methods of contraception at every encounter with a healthcare worker during the ANC period, to allow for informed decisions and in good time (National Family Planning Services for Service Providers, 2015).

Standard practice dictates that the timing of permanent sterilization procedures be informed by the patient's preference, attendant medical comorbidities and past surgical history. Conversations regarding the choice of these methods can begin during ANC visits, following an abortion and in post-natal visits. These are the points of possible interactions between a health care worker and the mother seeking reproductive health care services and should be followed up leading to a decision towards the contraceptive choice. Findings from various studies indicate a need for knowledge, specifically addressing the issue of cultural, religious and even factual misconceptions undermining the utilization of BTL(Ochako, 2015). This study aims to establish women's knowledge of BTL during their clinic visits, and subsequently offer further knowledge on its health benefits and risks, with the aim of increasing knowledge level. This will go a long way in helping women make an informed decision regarding BTL for those that consider it, and avoid the haste that happens in the peri-partum period. This could also lower the psychosocial effects associated with having a rushed tubal ligation.

1.2 Statement of the Problem

As of 2015, the KHDS showed that half of all married women aged 15-49 years desired to stop childbearing, but only 11% of these women utilized a long-term method of contraception. This is so, even though, such a method would suit their lifelong contraceptive target. The low utilization of this highly effective method in a category of women that so much need it contributes to 35% of unintended pregnancies in Kenya (Amo Adjei et al., 2019).The consequences of unplanned pregnancies are big for women and children, and yet their health is an important indicator of a country's economic health and well-being (United Nations, 2010). Consequences of unplanned pregnancies include induced abortions, and poor maternal and child health, all of which contribute to significant morbidity and mortality in this population.

The World Health Organization has established that each year, nearly 50 million of the 190 million women who become pregnant undergo abortions to terminate unwanted pregnancies, and about 13% of maternal deaths are caused by complications of abortion. Additionally, for every woman who dies in the course of pregnancy and delivery, many others suffer long-lasting physical and psychological illnesses (Lutala, Hugo&Luhiriri,2011). Empirical studies from Matlab, Bangladesh (Bhatia, 2019), showed that if women younger than 20 years and those older than 39 years avoided having children, maternal mortality would decrease by 34%, and elimination of births in mothers with five or more children could reduce the number of maternal deaths by 58%. This study seeks to get baseline data on knowledge of BTL, give appropriate information regarding BTL, and assess the impact in terms of knowledge.

In the KHDS done in 2014, women demonstrated knowledge of at least one method of contraception. 95% of the interviewed women reported knowledge of the injectable method of contraception, while only 78% of them reported knowledge of female sterilization, which was the lowest among the modern contraceptive methods. WHO data indicates that 99% of maternal deaths occur in developing countries (Okonofua,2021) Maternal mortality in women of childbearing age contributes to about 14% of all adult women deaths in Kenya (Ochako, 2015). Contributory factors include abortion which is a result of unwanted pregnancies, especially in the teenage group. And although abortions are largely reported in young women, it has also contributed to deaths in older women who due to a lack of knowledge of their reproductive rights and contraceptive options, continue having children against their desire (Håkansson, Super, Oguttu & Makenzius, 2020).

Sub-Saharan Africa has a huge burden of termination of unwanted pregnancies among women of reproductive age, primarily contributing to maternal morbidity and mortality.

Given the abortion restrictions in most countries, most abortions go unreported, hence the burden is highly under-reported. Addressing issues about reproductive health, in particular, knowledge of effective contraception, such as BTL, will empower women in their reproductive decisions. Empowered women will be able to limit childbearing to their desired family size, attain desired financial freedom and most importantly, take charge of their wellbeing. A healthy woman is equal to a healthy society. This will also greatly contribute to the achievement of SDGs 1-5.

1.3 Objectives of the Study

1.3.1 General Objectives of the Study

The Antenatal Care package includes counselling for family planning options. Despite being standard practice, there is limited information offered in the busiest antenatal care clinics, and can be mistakenly omitted, unless the client actively seeks out such information. This is mostly the case for young women with low parities, whereby health workers may fail to offer knowledge on all available methods as they are deemed to still be in their active reproductive years. Knowledge is good, even if not immediately utilized, as it would inform future choices. In addition, to every woman who gets accurate information, a whole lot in the community will benefit, hence the more knowledge is offered, the more it will transcend to other women. The snowball effect will positively influence the uptake of effective contraceptive methods. The purpose of this study is therefore, to determine the impact of an educational intervention on the knowledge of Bilateral Tubal Ligation among women attending antenatal and family planning clinics at the two referral hospitals in Bomet County: An interventional study.

1.3.2 SpecificObjectives of the Study

i. To establish the social demographic characteristics of women attending ANC/Family planning clinics at Tenwek and Longisa Hospitals in Bomet county
ii. To assess the knowledge level of BTL in women attending ANC/Family planning clinics at Tenwek and Longisa hospitals in Bomet county
iii. To determine the impact of an educational intervention on the knowledge of BTL among women attending ANC/Family planning clinics in Bomet county

1.4 Research Question

What is the impact of an educational intervention on BTL among women attending ANC and family planning clinics at Tenwek Mission Hospital and Longisa County Referral Hospital in Bomet County?

1.5 Research Hypothesis

Ho1: The implementation of an educational intervention targeting women attending ANC and family planning clinics at Tenwek Mission Hospital and Longisa County Referral Hospitals in Bomet County will lead to a significant increase in the knowledge of Bilateral Tubal Ligation

1.6 Justification for the Study

Given the high rate of maternal mortality due to complications of unplanned pregnancy, and in the background of women who have higher fertility rates than would be desired, a study that focuses on women's health and especially their knowledge of family planning options specifically a method that allows limiting childbearing where desired is of utmost importance. On a wider scale, limiting unwanted pregnancies will also curb overpopulation that subsequently leads to economic distress.

1.7 Significance of the Study

i. Based on a bibliographic search, there is no published data in the country on educational intervention pertaining to BTL.
ii. Information obtained in the course of the intervention will impact the community not only during the study period but also after and influence positively the uptake of BTL.
iii. The study will emphasize the need for healthcare workers to counsel women generally on contraception as recommended in the Ministry of Health ANC package, as this will facilitate informed decision-making towards effective contraceptive methods.
iv. Conducting this intervention will allow women to have the right information as pertains to BTL, not only for themselves but also for women who were not directly reached by the intervention

1.8 Scope of the Study

The study was conducted in the county of Bomet, South Western, rural Kenya. It is an educational intervention study, aimed at increasing the knowledge level of BTL among women in the region. The actual study has taken about three months. It targeted women attending the antenatal and family planning clinics at Tenwek and Longisa County Referral hospitals. The two are the main referral hospitals in the county and with high patient retention rates.

1.9 Limitations of the Study

The following were the limitations of the study;

i. The study is interventional, pre and post-design. Women interviewed in the pre-intervention, those who receive the intervention and those on whom the post-

intervention survey will be carried out, will rely highly on facility patient retention to determine the relationship between intervention and outcome.

ii. Many centers are offering antenatal care in the county, but the study will be done at only two facilities in Bomet County. The two facilities have the advantage of high patient retention rates. The hope is that the information obtained will reflect the knowledge status in the other facilities as well as the county. Positive results would inform the translation of similar interventions. In addition, some women might opt for alternative methods of contraception other than BTL.

iii. Language barrier as a limitation will be mitigated by the use of a research assistant conversant with the local vernacular as well as Kiswahili. However, there might be a loss of information in the translation process.

1.10Assumptions of the Study

The following assumptions guided the study;

i. Most of the women coming for ANC visits at Tenwek and Longisa hospitals will subsequently return for follow-up clinics and deliveries at their respective hospitals, due to their high retention rates

ii. The knowledge offered at the Antenatal visits is likely to spread to the community

iii. Women will give true information regarding their knowledge of BTL in both the pre and post-intervention phases

CHAPTER TWO

LITERATURE REVIEW

2.1 Introduction

This chapter will seek to look at the differences in uptake of BTL in the developed and low to middle-income countries and contributory factors thereof. To this effect, the study will largely employ readily available literature in the African continent, regionally and even in Kenya that has addressed some of the reasons that could contribute to the low uptake of female sterilization. The review will then delve into experiences of women with a desire to limit further childbearing with a focus on individual, interpersonal and organizational level factors that influence their decisions.

2.2 Literature Review

2.2.1 Social and Demographics Characteristics that Influence the Uptake of BTL

Society has been shown to play a major role in people's decision-making and strongly determines the direction a decision takes. Women opting to stop childbearing due to the achievement of desired family size may experience societal pressures that affect the possibility of actualizing such a thought. Kabagenyi, Reid, Ntozi and Atuyambe (2016), in rural Uganda, sought to establish some of the social-cultural factors that inhibit the utilization of modern contraceptive methods. The study was conducted among both men and women with the use of Focus Group Discussions and in-depth interviews. Findings from the study identified central themes that play a major role in undermining the knowledge and use of modern contraceptives such as BTL. The study showed a need for men and women that was driven by cultural factors to continue with childbearing, despite achieving their desired family size.

The most cited reason was the lack of a son in the family, who would be the heir. Moreover, the replacement of dead ancestors by giving birth to as many children as would be named after them was of utmost importance and was seen to appease the departed family members and to continue the clan's existence. In addition, the study showed a high level of importance placed on parents who delivered twins. An interesting finding from this study indicated that once parents had twins, childbearing could not end with twins, but culture demanded that they had to get an additional singleton birth. This highly impedes contraception in women who at the point of delivering twins, might have already acquired their desired family size. Further, polygamy is largely acceptable in most African cultures and wealth in the African cultural context is often attributable to the number of children one has. Often, the number of children is also a sign of future security, hence a growing desire for co-wives to sire many children in the interest of future inheritance for themselves through their children. Notably, wives in polygamous relationships are reluctant to use contraceptive methods due to the mentioned competition among themselves.

According to Kabagenyi, et al (2016), marriage is almost equal to having children. It is an expectation that married women continue to have children throughout their reproductive life and this is seen as the reason why bride price is paid. In addition, most men prefer their women to have many children, hence the women, out of respect for their husbands, continue having children beyond their desire. In Nigeria, it is believed that a woman should not manipulate her body to prevent pregnancy as this may further interfere with her sexuality. (Akpor, Fadare& Ekanem, 2016).

Most societies attribute children to being a blessing from God. In the findings from the study in Uganda, the participants reported that they believed that God provided for the children born, despite their numbers. This was considered to be in line with most

religions. As an example, Islam and Catholicism consider contraception as interfering with God's will, and in fact as actually killing the unborn child. It is thus that ardent followers of this religion shun contraception with the fear of sinning. Hinduism considers any manipulation of the human body, such as getting a BTL as interfering with reincarnation (Marchin, Seale, Sheeder, Teal &Guiahi, 2020). In a study done in Nigeria, more than a third of women participating in the study commented on the fact that BTL goes against their religious beliefs. This was supported by the fact that the Bible, for Christian followers, actually calls for fruitfulness and multiplication (Akpor,et al 2016).

African societies are largely patriarchal. This means that men are the decision-makers in most pertinent issues and are the sole decision-makers concerning family size. Female counterparts obediently continue to bear children against their desire for fear of violence or being chased from the marital home (Kinuthia, 2013). This undermines the promotion of gender equality and empowerment of women (Sachs et al., 2012). A study was done in East and Central parts of Kenya looking at factors influencing the uptake of Bilateral Tubal Ligation in women who had achieved their desired family size found that poor communication between couples regarding desired family size and even choosing a contraceptive method largely affected uptake. It was found that there was either no communication at all or that if present, it was instructional in situations where the wife was considerably younger than the husband. In such situations, women would not make autonomous decisions regarding their fertility desires, and would therefore continue childbearing for as long as the man said she should. Certainly, women in such situations would not consider using a permanent method such as BTL for fear of consequences if their husbands ever found out.

Conversely, a couple that openly communicated about desired family size would easily reach an agreeable decision even as to the choice of contraceptive method (Hiuhu et al., 2020). In a Kenyan study, 70.3% of women who took up BTL as a contraceptive method had spousal (Kinuthia, 2013). The uptake of permanent contraceptive methods such as BTL has been directly associated with socio-economic status, in that, women who had many children were likely to be poor and thus were seeking out more permanent methods of contraception (Kabagenyi et al.,2016). This was also linked to low educational levels leading to early marriages and hence more children. The Kenya Health and Demographics Survey 2014, however, notes that if the number of children remained constant between the poor and the considerably wealthy, there was likely to be a greater need to limit childbearing in the wealthier population. The KHDS also notes an increase in the need to limit childbearing with an increase in education level, though with a mixed picture in extremes of parities. Conversely, Kinuthia, 2013, notes no relationship between socioeconomic status and the uptake of BTL, but that those with a reasonable source of income were more likely to have a BTL done.

2.2.2 Factors Affecting Knowledge of BTL

In a study done in Ethiopia by Alemayehu et al.(2012), female sterilization was viewed as the 'removal of the womb', or 'tying of the womb'. In association, the surgical nature of this procedure and perceived complications intraoperatively such as death of the woman or cutting of other body organs are extremely pervasive in its utilization. A section of women in this study believed that the procedure was only to be utilized by women suffering from other medical problems, in that the process of having another child would be a risk to the woman's life. In this study, it was thought that such risks were high in women who still had 'children in their womb' at the time of the procedure. The fear of this procedure as seen in a study in Sweden, by Ehn et al., 2021) has been

shown to make women wait for years from the time they thought about a Tubal Ligation to the time they decide to go ahead and get it done. The fear of surgery and potential loss of life has led some women to opt for BTL during caesarean delivery since it is an unavoidable opportunity to undergo surgery, and would not consent to it otherwise (Adebimpe, 2016).

The decision to undergo BTL is considered life-changing. When it comes to contraception, sources of information that women utilize mostly include experiences of colleagues, friends and relatives, and this is more so for BTL. A study by Olakunde et al. (2019) showed that women who undertook BTL as a method of contraception at a young age or had few children, and with no male child, were considered to have had a high risk of regret. This can deter other women who may consider permanent contraception. It is thus imperative that women are extensively counselled before taking up BTL, to reduce the chances of regret and other psychosocial implications.

A qualitative study done in a rural district in Congo, by Lutala et al. (2011),in an attempt to establish the psychosocial implications of tubal ligation noted that women experienced somatic symptoms, though in varying degrees. This included menstrual pain backaches and even swelling of the belly. Some considered this to be a preferable experience to being at risk of having another pregnancy, while others experienced so much discomfort to the point of considering re-opening their tubes. Some of the psychological effects on women who had already undergone BTL included attribution of the procedure to other health problems, and this was considered to be a punishment from God due to disrespect for his plan for reproduction (Lutala et al., 2011). Additionally, Some participants in this study reported experiencing marital disharmony and even lack of sexual satisfaction due to the pain experienced during intercourse. Others experienced

a need to continue childbearing after tubal ligation, and this was due to the death of children, or risk thereof due to the civil war experienced in the rural district of the study.

Some study participants reported experiencing great peace and satisfaction mentally because they did not have to worry about pregnancy and its related complications. This, additionally improved intimate relations with their partners. Other women who underwent sterilization reported reduced productivity as a consequence of the surgery and associated general body weakness and pain, while another reported an effect in the reduction of expenses, hence improved living standards(Lutala et al., 2011).

Some social implications of BTL reported by women included a decrease in sexual desire, and continuous menstruation all of which were reported to lead to a reduction in sexual contact and ultimately conjugal strife. Other participants reported a change of mind in their husbands about having more children after the procedure had long been done. This led to such men planning to re-marry which in essence highly contributed to household disputes. Sterilization had some reported social benefits including reduced costs of living due to manageable family sizes regarding food and education as well as a reduction in maternity-related expenses. It also allowed women to preserve their health as well as promote that of their children (Lutala et al., 2011).

Some women reported a lack of proper counselling before the procedure, as the decision may have either been made by the doctor only, or by the doctor and husband or other family member without consulting with the patient. Such women experienced negative feelings more so those who wished to have another child (Lutala et al., 2011).

2.2.3 Factors that Would Impact Knowledge and Subsequent Uptake of BTL

In a retrospective analytical study done in South West Nigeria by OA et al. (2016), a majority of women undergoing Bilateral tubal ligation were because it was a repeat

Caesarean section and done at the time of caesarean delivery. In this group of women, the main motivation towards sterilization was due to the risk associated with additional pregnancies, and not primarily due to the achievement of desired family size. Of the participants, only 13% of them got comprehensive counselling during their Antenatal visits. This goes to show the need for further counselling during ANC visits for women, on the advantages and disadvantages of sterilization to aid them in making an informed contraceptive choice, and one that supports their reproductive needs. A study in Sweden showed that healthcare workers were reluctant to offer BTL as an option for family planning to women attending antenatal and family planning clinics. The study indicates that most healthcare workers would only talk about BTL if the woman had already mentioned it as an option they would like to pursue (Ehn et al., 2021).

This was seen to impede the utilization of BTL. Additionally, provider bias has been noted to have an impact on the utilization of BTL, in that healthcare providers who perceived a woman to not have achieved the adequate number of children did not talk to them about BTL or even influence their decision otherwise. This was also noted in young women who needed a family planning method. A study by Welch, Lindberg, Mauney and McLeod (2020), showed that educating healthcare personnel working in the reproductive health unit on current information and correcting any perceived barriers to the uptake of BTL improved the utilization of this procedure from 39% to 54%. This is important, as healthcare workers living in the same community may also have misconceptions concerning BTL which may impact its uptake due to their role. Another study in Western Kenya by Amo-Adjei et al. (2019), highlighted the need to counsel women who desire to stop childbearing on both long-term and permanent contraceptive methods, and that this greatly contributed to their utilization. Further, counselling by healthcare providers helped demystify misconceptions associated with such methods.

This was found to be true for both the developing and the developed world. The study further indicated that the misconceptions were fueled by a lack of awareness of potential benefits and risks. The study concluded that women who received counselling were more likely to take up long-term and permanent methods such as BTL.

On the other arm, increased counselling and discussion of alternative and reversible methods of contraception such as contraceptive implants (Implanon Classic, Implanon NXT&Jadelle, 2020) and intrauterine devices have been shown to contribute to the down-trending pattern of female sterilization. Women may want to keep their fertility options within the range of reproductive years through these reversible long-acting contraceptive methods.

Healthcare workers working at antenatal clinics play a crucial role in contributing to knowledge, thereby influencing the choice of contraceptive use by providing information and guiding their decision-making process without undue coercion or forcible appeals. All policies and organizational structures should therefore serve to empower the clients as well as foster motivation amongst service providers towards this goal (Mesfin &Kibret, 2016). Informed decisions through thorough counselling regarding risks, benefits and alternative options is imperative (Voluntary tubal ligation, Nigeria). The introduction of bias by service providers during counselling sessions was attributed to their attitudes and personal concerns towards BTL and might contribute to the observed low uptake (Adebimpe, 2016). Adherence to the ethical considerations and statutory policies is important towards standardization and mitigation of these biases.

In a prospective analysis by the Collaborative Review of Sterilization (CREST, 1996), it was estimated that about 12.7% of women who had undergone sterilization regretted this decision. Factors that have been associated with a high regret risk include having an

unstable relationship, low parity, and young age at the time of sterilization (ACOG Practice Bulletin,2019) Additionally, women who decide in the postpartum phase have also been shown to have a higher risk of regret. It is thus necessary to engage women in their early antenatal visits to curb the urgency of making such a life-changing decision. ACOG Practice Bulletin 2019 reports approximately 50% of women who had requested postpartum sterilization during their antenatal visits did not get it done. Attributed reasons for this included concern by the healthcare team that the patient was too young for the procedure, incomplete consenting process, lack of an operating room or even lack of necessary anesthesia. This contributed to as much as 46.7 % of unintended pregnancies within a year after discharge. It is therefore important for healthcare workers to advocate for patient requests and work to mitigate any barriers that may undermine this.

In a study done in Nigeria, more than a third of the participants in the study reported knowledge of BTL as a method of contraception, however, it was their perception of this method that limited utilization. The perception was largely influenced by their religious stands. Other factors that limited uptake of BTL were perceived side effects such as long-term pain and loss of libido. This is reiterated by Amo-Adjei et al. (2019), in a study done in Western Kenya, indicating that the low uptake of BTL and other long-acting methods was due to a deficiency of knowledge of the benefits and risks involved and that most decisions were based on misconceptions. Additionally, in a study done in Ethiopia, 76% of women reported not knowing the efficacy of Tubal ligation and in a similar study in Ethiopia, half of the participants knew about Tubal Ligation, but there was deficient knowledge of where to access the procedure. According to Akpor et al (2016), a study done in Nigeria to assess the knowledge and perception of women about BTL showed that two-thirds of the women involved in the study knew BTL. However, a

third of them stated that it was a risky method, and would not recommend anyone to utilize it, hence indicating that the knowledge they had did not impact their use of the method. In Ethiopia, among 460 married women taking part in a study, only 12.3% of them utilized long-acting methods of contraception, and none among them had undergone BTL. There was little knowledge or none reported on this method. Additionally, among the women who knew the permanent method, more than fifty per cent of them had a negative attitude towards it, linking it to marital disharmony (Alemayehu et al.,2012). This was due to perceived side effects that may interfere with libido.

In a study done in Kenya by Kinuthia (2013), to assess factors that influence the uptake of BTL in former East and Central provinces, found that 97.3% of women were aware of what BTL was, with the knowledge that it involved tying of the tubes, while the remainder either thought it involved removal of the ovaries or the uterus, further indicating a knowledge gap as to what exactly the procedure is about. It is worth noting the high level of knowledge of BTL in the different study populations, yet despite this, there is still a huge gap in the uptake of this method. This could be confounded by the use of other long-term methods. This study population had a relatively higher uptake of BTL as compared to other regions of the country (KHDS 2014), including the region of the current study (South Rift). The study however did not conclude that the high level of knowledge translated to an increased uptake of BTL as a causal relationship, or it was due to the fact there is a general better knowledge of all methods of contraception as well as their uptake. The gap here is whether women claiming to know about BTL do have the facts or it is based on hearsay. As noted women mostly get knowledge concerning family planning from the antenatal clinics, peers, relatives, church and also

from social media. According to Akpor et al. (2016), but their actual uptake is highly influenced by other women's experiences or opinions.

It is standard practice to offer family planning information to women during their antenatal visits. WHO recommends at least four antenatal care visits for all healthy mothers (Contraceptive Sterilization, Global Issues and Trends, 2003). Emphasis on birth spacing should be done at the very least on the third and fourth clinic visits. This is the most reliable and accurate source of information for women and forms an integral part of women's decision-making. This study aims at particularly offering information concerning BTL to women to correct any misconceptions that may deter uptake of this highly effective method of family planning, to those desiring to stop childbearing.A study done in Muranga, Kenya by John Hiuhu et al. (2020), suggested the involvement of male partners to increase the uptake of long-term family planning methods, BTL included. Despite many women citing their independence and autonomy in making these decisions, the majority of the women (53%) would still feel the need to consult their male partners before undergoing procedures. It concluded that there is a surmounting need to increase the knowledge amongst men through outreach activities and education as a catalyst to willingness and uptake by women to such procedures as BTL through mitigating societal opposition and improving psychosocial, material and logistical support, amongst others. Based on this study, we will encourage women to bring their partners along during the antenatal clinic visits.

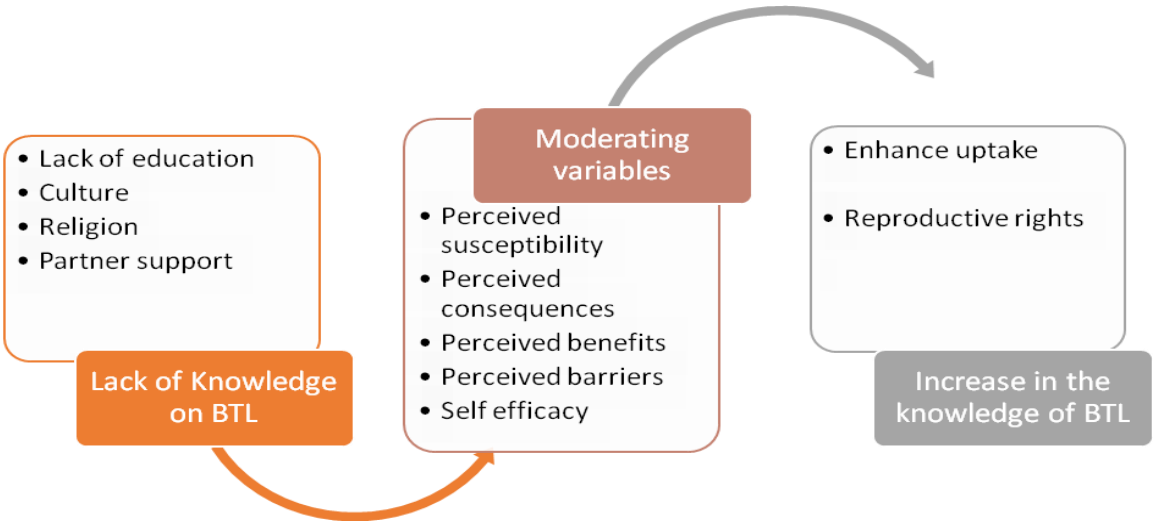
2.3 Conceptual Framework

The Health belief model (figure 1) by Rosenstock (2000) is effective in predicting behaviour change. The model is based on the 5 categories; Perceived susceptibility, in this case, getting pregnant after achieving desired family size. Second, a woman must

believe that the pregnancy has potential consequences, the severity of which will influence a behaviour change; an example includes a risk of an unwanted pregnancy that could then risk one getting an abortion. Third, the individual must understand the benefits of the behaviour change; for example, the health benefits associated with utilizing BTL after the achievement of desired family size, that BTL is an effective, user-free method with the additional benefit of lowering the risk of ovarian cancer. Self-efficacy understands that one can perform the behaviour change. These factors are then weighed against known risks, which in this case are extremely minimal. Most barriers are informed by cultural misconceptions fueled by a lack of knowledge.

Figure 1

Conceptual Framework



Note: Health Belief model (Rosenstock, 2000)

CHAPTER THREE

RESEARCH DESIGN AND METHODOLOGY

3.1 Introduction

The chapter highlights the research design, and study population and describes how the sample size was calculated. It will describe how data will be collected, handled and stored.

3.2 Research Design

A quasi-experimental, pre-post study design on knowledge level of BTL and post-educational analysis of knowledge level was assessed. Two arms were compared, pre-intervention and post-intervention, to suggest the impact of the educational intervention (Thiese, 2014). The educational interventioncomprised the use of a manual as adapted from the Kenya National Family Planning guidelines. A pre-validated questionnaire was utilized.

3.3 Location of the Study

The study was conducted in two main hospitals in Bomet County, they include;

i. Tenwek Mission Hospital, a level 6B faith-based referral hospital
ii. Longisa County Referral Hospital, a level 4 government referral hospital

The aforementioned hospitals are the two main hospitals in Bomet County, and are strategic locations for women in search of services due to their extensive resources that include; mother-child health, antenatal services, emergency obstetric care and postpartum services. The hospitals also serve as the two main referral hospitals in the county.

3.4 Study Population

All women, aged above 18 years and presenting to Tenwek and Longisa county referral hospital's Antenatal and Family Planning clinics.

3.5 Sampling Procedure and Sample Size

3.5.1 Sampling Procedure

The two hospitals in Bomet County were purposively selected, to do a population study on all women attending ANC/MCH and Family planning clinics at both hospitals. Longisa and Tenwek hospitals are the two largest referral hospitals in the county. Tenwek Hospital is a 361-bed hospital with a wide range of surgical, medical, maternity, and paediatric services. It is one of the largest mission hospitals in the region and seeks to provide primary healthcare to 600,000 Kipsigis people within a 32-kilometre radius and serves as a referral centre for an even much larger region.

Longisa County Referral Hospital is a level 5 county government health care facility located in Longisa which has a bed capacity of 144. It largely serves the Bomet population, offering more subsidized medical services. It offers a wide range of services including surgical, maternity, paediatric and general medicalservices. Women presenting to the two facilities' ANC and family planning clinics were recruited to participate in the study. Recruitment of willing participants was achieved by the use of trained research assistants, a nurse in each of the facilities working at the mother-child health and family planning clinics, who informed potential participants of the study and its aims. This was done at the waiting bay of the clinics, and a flyer indicating the ongoing teaching on BTL was availed. The research assistant was able to answer questions from potential participants. This allowed adequate time for participants to think and fully consent to the study. The two hospitals register about 30 women each

day, but notably, some are on repeat visits. There are therefore about 10-15 new visits in a day. The WHO ANC package requires that information on various methods of family planning be explained to every woman attending the clinic, and thus, the clinicians involved offered the information as done routinely. Written consent to answer the questionnaire was sought from participants. Training of research assistantsensured that they were well versed with the study objectives and possible outcomes. They were taken through the data collection tools and procedures, and a mock process was done before initiating data collection. This ensured understandability as well as a standardized process to minimize exposure bias.

A population study was done on women attending Tenwek Hospital and Longisa County Hospital's ANC/MCH and family planning clinics. Convenient sampling was employed, whereby each woman attending these clinics had an exactly equal chance of being selected. Both the pre and post-interventional groups of women were selected from a subset of women in the community, who presented to the two facilities, thus, they were two different groups.

Inclusion Criteria

i. All women attending ANC/MCH and Family planning clinics at the two facilities. For those speaking languages other than Kiswahili and English, translation will be done.
ii. Age above 18 years

Exclusion Criteria

i. Women who are unable to participate due to a mental illness or any other medical illness, in whom participation would cause a delay in their care

3.5.2 Sample Size

Sample size was determined by the formula described by Hulley, et al., 2001

The standard normal deviate for $\alpha = Z_\alpha$

The standard normal deviate for $\beta = Z_\beta$

Pooled proportion = $P = (q_1 * P_1) + (q_0 * P_0)$

$$A = Z_\alpha \sqrt{P(1-P)(1/q_1 + 1/q_0)}$$

$$B = Z_\beta \sqrt{P_1(1-P_1)(1/q_1) + P_0(1-P_0)(1/q_0)}$$

$$C = (P_1 - P_0)^2$$

$$\text{Total group size} = N = (A+B)^2/C$$

Values substituted into the equation

The standard normal deviate for $\alpha = Z_\alpha = 1.9600$

The standard normal deviate for $\beta = Z_\beta = 0.8416$

Pooled proportion = $P = (q_1 * P_1) + (q_0 * P_0) = 0.7400$

$$A = Z_\alpha \sqrt{P(1-P)(1/q_1 + 1/q_0)} = 1.7194$$

$$B = Z_\beta \sqrt{P_1(1-P_1)(1/q_1) + P_0(1-P_0)(1/q_0)} = 0.7189$$

$$C = (P_1 - P_0)^2 = 0.0400$$

$$\text{Total group size} = N = (A+B)^2/C = 149$$

(Rounded off to 150)

Pre-intervention arm 80 (40 for each hospital) Post-intervention arm 80 (40 for each hospital)

P_0 Baseline knowledge from previous studies=64.5%(0.64)

P_1 Estimated level of increase in knowledge from baseline=20% to 84%(0.84)

For each arm of the intervention, 80 participants were recruited from both hospital sites. Set Level of significance is <0.05

3.6 Instrumentation

A pre-validated self-reported structured questionnaire, in line with the study title, was offered to the study participants. It covered socio-demographic information thatincluded age, parity, marital status, level of education and religion. Participants' identifiers were omitted to ensure confidentiality. The women were required to select Yes/No options in the questionnaire. The questions assessed knowledge of BTL, perceived risks, and benefits. Knowledge level was assessed using the questions specific to knowledge. A designated research assistant aided the women who may have literacy challenges in filling in the questionnaire details. The questionnaire is shown in Appendix 1. It was constructed based on the Health Belief Model of behaviour change and adopted by Makhathini et al. (2019). The questionnaire was used in a study at Kwa Zulu in South Africa to assess knowledge, attitude and perception of BTL among antenatal women about post-partum BTL.

Two research assistants who were nurses by profession, and already working at the MCH/ANC clinics were recruited and trained in data collection tools and the aim of the study. They then facilitated the filling of the data collection tool, by ensuring compliance. They were fluent in English, Swahili, and Kipsigis languages since they are the most spoken within the study location. The research assistant was conveniently situated to capture all the women attending the clinics. Two health care professionals (clinical officer, medical officer, or nurse) working at the ANC/MCH and Family planning clinics were also primed about the possibility of the need to be used as translators given their diverse cultures and proficiency in different languages. A safe, secure, and comfortable environment was provided for the interviewing purpose of the respondents.

WHO ANC package requires that information on various methods of family planning be explained to every woman presenting to these clinics at every interaction. In this study, the clinicians involved will offer the information as done routinely, and thus will not require any verbal or written consent from the women for the knowledge intervention.

In the second phase of the study, the research assistant(s), with the aid of an educator's manual provided, explained the facts on BTL to the target women. This included details on the anatomy involved during the intervention, eligibility criteria, benefits and risks of the procedure. Multiple sessions of group education via pictorial representation and written material were conducted throughout the day. The materials were available in two languages (English and Kiswahili). The education guide was adopted from Kenya National Family Planning Guidelines 6th edition, 2018, and reflects the WHO medical eligibility criteria updated in 2015. This phase took a month, after which one month was allowed for information to get to the community.

In the third phase of the study, a population of women again visiting ANC and family planning clinics of these two hospital sites was recruited and sampled as in the 1st phase, and consented. The pre-validated questionnaire was offered. It was translated into three languages (Kiswahili, English and Kipsigis) and stapled together so that the respondent could choose which language to use. The language used was simple so that the majority of participants could understand.

The filled interview guides were dropped in a sealed box so that they could not be altered, retrieved, and traced back to the respondent following the interview. They were collected at the end of each day by the principal investigator. Knowledge was assessed by finding an average of answers given to the knowledge questions.

3.7 Data Collection Procedure

The study was quantitative; with pre and post-interventional design, looking at baseline knowledge of BTL and the impact of educational intervention on the same**.** The estimated time for data collection was to be three months.

This interventional study was carried out in three parts. The first wasthe establishment of baseline knowledge, followed by a period of educational intervention. Data collection was then done a month later to establish the efficacy of the educational intervention in the same clinics. Based on KirkPatrick's model of learning (Panchenko, 2013), a structured questionnaire was used to assess pre and post-intervention knowledge. The research assistants were provided with sealed questionnaire forms. A box to deposit the finished questionnaire forms was also provided. All boxes were sealed to avoid possible retracement of identifiers and tampering with the completed questionnaires. Access was only allowed to the principal investigator, who also ensured proper proceedings of the data collection.

The study participants who were physically, mentally, and emotionally ready to participate were approached during their routine visits to ANC/MCH and Family Planning clinics. The research assistants were assigned this role for consistency purposes. They conducted direct interviews using the interview guide in a safe room within the hospital, such as the counselling room or nursing office. A designated primed health care professional was availed when there was a need for proficient translation (in the event of women speaking vernacular languages other than Kipsigis). They additionally helped in identifying women who were not in a position to participate e.g., those with mental illness or altered mental status and those with emotional trauma from prior poor birth outcomes.

The written material was in three languages; Kiswahili, English and Kipsigis, and was to be administered in the language best understood by the interviewee. Any respondent who did not wish to participatecontinued to receive care, regardless of their reasons for declining.

The interview guide provided was close-ended. The research assistantsoffered any explanation related to the question that the respondentssought clarification on. Information obtained was treated with utter confidentiality. Key identifiers of the participants were not on the interview guide. Duly filled questionnaires were kept safely after interviews by dropping them into the secure box provided.

3.8 Data Analysis

Before data analysis, completeness and accuracy of collected data was ensured by first profiling the data and also with the aid of a software program. This was done by the principal investigator.

Data analysis was done using SPSS software, version 27, with the help of a statistician.Sociodemographic data was analyzed by frequencies and percentages and presented in charts and graphs. Data from the pre and post-intervention period was analyzed by use of the one-sample t-test. The mean of the pre-test scores was used as the threshold score against which the post-test score will be compared (Bonate, 2000). Data was then subjected to inferential statistics, and Pearson's chi-square test to determine significance. Statistical significance was set at 95% confidence interval.

3.9 Ethical Considerations

Approval to do the study was sought from the Kabarak University Postgraduate School (IPGS), followed by the Kabarak University Research and Ethics Committee and a

research permit from the National Commission for Science, Technology and Innovation (NACOSTI). Permission was also sought from the two hospital sites to conduct the study.

Participation was voluntary without coercion and with no incentive or issue. Potential emotional and psychological harm to the patient was mitigated by avoiding mass education, especially at the hospital waiting bay during gynaecological clinic visits. Appropriate medical consultation and counselling services were to be immediately provided by physicians, chaplains, and psychiatric/counselling nurses or clinical officers, in cases of any unanticipated emotional distress or mental breakdown during the interview process.

Before the direct interview and signing of the consent form, all efforts were made to ensure that the respondents understood the following:

a) The aim of the study, the process involved and potential risks
b) The respondents could withdraw from the study at any point without any reproof
c) There would be complete anonymity
d) No identifier would trace back the interview guide to the patient.
e) No patient names, admission numbers or key identifiers would appear in the interview guide.
f) Their care would not be affected even when they refused to participate in the study
g) The principal investigator would not have any contact with potential participants

3.10 Data Handling

Filled questionnaires were stored in a locked and sealed box to avoid possible retracement or any potential tampering by research assistants. There were no key identifiers of the study participants.

These filled questionnaires were only made available to the principal investigator, supervisors, and statistician as needed. After analysis, the questionnaires were stored in a safe place under lock and key for a minimum of 10 years or until the University archivist approves the need to discard the data by shredding and burning. The principal investigator plans to share the findings of the study through various hospital forums and platforms to disseminate the results for education purposes as well as inform of future research areas to help shape health care policies.

CHAPTER FOUR

DATA ANALYSISPRESENTATION AND DISCUSSION

4.1 Introduction

This chapter presents the study's findings and its interpretation. The hypothesis in this study was that an educational intervention would result in an increase in BTL knowledge in the target group over time.

4.2 General Demographics and Information

Women seeking ANC services in the selected study site were recruited. Only those who consented to participate in the study were considered. The interview lasted roughly 5–10 minutes. Baseline and post-intervention assessments each had 80 participants. Because of the fairly good retention of these women at the selected sites, the majority of the women who were on the baseline assessments were also on the after-intervention arm.

4.3 Social Demographic Characteristics

The participants' mean ages were 29.0±5.76 years before intervention and 29.2±5.6 years after intervention; also, the majority (95%) of these participants were between the ages of 21 and 39 years. The average number of children was two both before and after the intervention, but around 40% of the individuals had three or more children. More participants (39%) had completed college, with approximately 11% having completed university-level education. The vast majority (98.8%) of these participants identified as Christians. In terms of occupation, most (51.9%) were self-employed, followed by those in formal employment, with only four indicating they were students. Determining whether there was a significant association in participant demographic characteristics. The number of children was significantly associated with pre- and post-intervention on a

discrete measure, but no significant association was found on a categorical scale. Significant associations were also found in marital status and occupation. However, no significant association was found in the participants' age, education level, or religion.

Table 1

Demographic Characteristics of Women Attending ANC and Family Planning Clinics in Bomet County (pre and post-intervention)

Participants Characteristics	Pre-intervention (n=80)	Post-intervention (n=80)	Total(N=160)	P-value
Age, mean (sd)	29.02 (5.76)	29.18 (5.46)	29.10 (5.60)	0.87
Age category(years), n (%)				0.13
≤20 years	0 (0.0)	4 (100.0)	4 (2.5)	
21 to 39 years	78 (51.3)	74 (48.7)	152 (95.0)	
≥ 40 years	2 (50.0)	2 (50.0)	4 (2.5)	
Children, mean (sd)	2.14 (1.38)	2.74 (1.75)	2.44 (1.60)	0.02
No of children, n (%)				0.06
No Child	4 (44.4)	5 (55.6)	9 (5.6)	
1 to 2 children	50 (58.8)	35 (41.2)	85 (53.1)	
≥ 3 children	26 (39.4)	40 (60.6)	66 (41.3)	
Married, n (%)				0.03
No	7 (87.5)	1 (12.5)	8 (5.0)	
Yes	73 (48.0)	79 (52.0)	152 (95.0)	
Education Level, n (%)				0.22
College	30 (48.4)	32 (51.6)	62 (38.8)	
Secondary education	23 (48.9)	24 (51.1)	47 (29.4)	
Primary education	14 (42.4)	19 (57.6)	33 (20.6)	
University	13 (72.2)	5 (27.8)	18 (11.2)	
Religion, n (%)				0.15
Christian	80 (50.6)	78 (49.4)	158 (98.8)	
Islam	0 (0.0)	2 (100.0)	2 (1.2)	
Occupation, n (%)				0.01
Formal employment	29 (56.9)	22 (43.1)	51 (31.9)	
Self-employed	32 (38.6)	51 (61.4)	83 (51.9)	
Housewife	15 (68.2)	7 (31.8)	22 (13.7)	
Student	4 (100.0)	0 (0.0)	4 (2.5)	

4.4 Assessment of Participants Reported Related to the knowledge of BTL

Sixty-six per cent that they had not met their target number of babies, with slightly more than half in the post-intervention arm. The majority of participants (62%) reported they would choose BTL, with approximately 52% in the post-intervention arm. Whether their religion permitted BTL, the majority (80.6%) responded yes and were backed by their husband (92%), while 62% stated they couldn't have BTL if their spouse was against it. Slightly more than 31% of participants utilize BTL, and the majority (98%) of them reported this on the post-intervention arm, with injection being the second option at 30% and 19% reporting they are currently not using any contraceptive methods. Only the present use of contraceptive methods in pre- and post-intervention showed a significant association.

Table 2

Assessment Related to BTL among Women in Bomet County

Variables	Pre-intervention (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Have you reached your target number of babies? n (%)				0.74
No	52 (49.1)	54 (50.9)	106 (66.3)	
Yes	28 (51.9)	26 (48.1)	54 (33.7)	
Do you want a permanent method of contraception in the form of BTL once you have reached your target family size? n (%)				0.51
No	32 (53.3)	28 (46.7)	60 (37.5)	
Yes	48 (48.0)	52 (52.0)	100 (62.5)	
Does your religion allow you to have BTL? n (%)				0.09
No	15 (55.6)	12 (44.4)	27 (16.9)	
Yes	61 (47.3)	68 (52.7)	129 (80.6)	
Not sure	4 (100.0)	0 (0.0)	4 (2.5)	
Do you need to involve your spouse in the decision of BTL? n (%)				0.55
No	7 (58.3)	5 (41.7)	12 (7.5)	
Yes	73 (49.3)	75 (50.7)	148 (92.5)	
Can you still have BTL even if your spouse is against your decision? n (%)				0.50
No	50 (48.5)	53 (51.5)	103 (64.4)	
Yes	30 (53.6)	26 (46.4)	56 (35.0)	
Not sure	0 (0.0)	1 (100.0)	1 (0.6)	
What is your current contraceptive method? n (%)				0.00
BTL	1 (2.0)	49 (98.0)	50 (31.3)	
Injection	31 (64.6)	17 (35.4)	48 (30.0)	
IUD	8 (61.5)	5 (38.5)	13 (8.1)	
Pills	3 (33.3)	6 (66.7)	9 (5.6)	
Implant	4 (57.1)	3 (42.9)	7 (4.4)	
Calendar	2 (100.0)	0 (0.0)	2 (1.2)	
None	31 (100.0)	0 (0.0)	31 (19.4)	

4.4.1 Knowledge Assessment of BTL

Participants were asked whether having BTL protects them from STIs/HIV, if there is a small risk of falling pregnant after BTL if pregnancy can occur outside your womb, if

they can change their mind about BTL before the procedure, if BTL will negatively affect their sexual life, and if BTL reversal guaranteed them the need to conceive.

The majority of participants (85.6%) were aware that having BTL does not protect them from STIs or HIV. However, about 78% of those who answered "yes" were in the post-intervention arm. Nine participants were unsure, with 5 from the pre-intervention phase. About 56% claimed there is no risk of falling pregnant following BTL, with 57% found in the post-intervention arm and seven of ten people who were unsure found in the post-intervention phase.

When asked if pregnancy can occur outside the womb, 52% said "No," 37% said "Yes," and 11% said they were unsure. Sixty-one per cent stated they are allowed to change their minds regarding BTL before the surgery, but 34% indicated they are not allowed. BTL does not negatively affect sexual life, according to 73% of subjects, with 8% unsure. According to 82% of the participants, BTL reversal is not guaranteed if one needs to conceive. "Is there a small risk of falling pregnant after BTL?" and "Is BTL reversal guaranteed if you need to conceive?" participants' responses were significantly associated pre-and post-intervention whereas the remaining questions on knowledge were not.

Table 3

Knowledge Assessment of BTL amongst Women in Bomet County

Variables	Pre-intervention (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Will BTL protect you from STIs/ HIV? n (%)				0.08
No	72 (52.6)	65 (47.4)	137 (85.6)	
Yes	3 (21.4)	11 (78.6)	14 (8.8)	
Not sure	5 (55.6)	4 (44.4)	9 (5.6)	
Is there a small risk of falling pregnant after BTL? n (%)				0.02
No	39 (43.3)	51 (56.7)	90 (56.3)	
Yes	38 (63.3)	22 (36.7)	60 (37.5)	
Not sure	3 (30.0)	7 (70.0)	10 (6.2)	
Can pregnancy occur outside your womb? n (%)				0.54
No	38 (45.8)	45 (54.2)	83 (51.9)	
Yes	32 (54.2)	27 (45.8)	59 (36.9)	
Not sure	10 (55.6)	8 (44.4)	18 (11.2)	
Are you allowed to change your mind about BTL before the procedure is done? n (%)				0.15
No	28 (50.9)	27 (49.1)	55 (34.4)	
Yes	51 (52.0)	47 (48.0)	98 (61.2)	
Not sure	1 (14.3)	6 (85.7)	7 (4.4)	
Will BTL negatively affect your sexual life, n (%)				0.13
No	57 (48.7)	60 (51.3)	117 (73.1)	
Yes	19 (63.3)	11 (36.7)	30 (18.8)	
Not sure	4 (30.8)	9 (69.2)	13 (8.1)	
Is BTL reversal guaranteed if you need to conceive? n (%)				0.01
No	59 (45.0)	72 (55.0)	131 (81.9)	
Yes	9 (60.0)	6 (40.0)	15 (9.4)	
Not sure	12 (85.7)	2 (14.3)	14 (8.7)	

4.4.2 Knowledge Score on BTL; Pre and Post-intervention

Knowledge was graded as 50% (poor), 51-75% (moderate), and 76-100% (good). Out of six questions, the correct aggregate score was calculated and converted to percentages; the percentages were then classified as shown above.

Forty per cent of the participants were categorized as having poor knowledge of the tested items about BTL, with around 56% on the post-intervention arm; generally, lower scores on knowledge were obtained in the post-intervention arm, implying that the educational intervention provided did not influence participants knowledge about BTL.

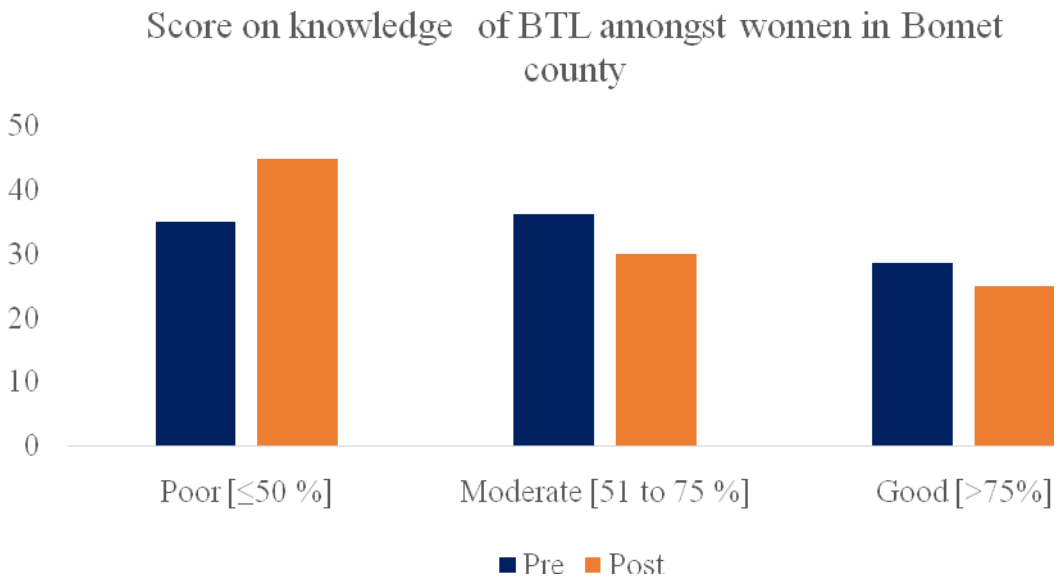
Table 4

Knowledge Score on BTL amongst Women in Bomet County; Pre and Post-intervention

Variables	Pre-intervention (n=80)	Post-intervention (n=80)	Total (N=160)	P-value
Knowledge Score Category, n (%)				0.43
≤ 50 %	28 (43.8)	36 (56.2)	64 (40.0)	
51 to 75 %	29 (54.7)	24 (45.3)	53 (33.1)	
> 75%	23 (53.5)	20 (46.5)	43 (26.9)	

Figure 2

Graphical Representation of Score on Knowledge of BTL;Pre and Post-intervention



4.5 Impact of the Educational Intervention on the Knowledge of BTL

The measure of effect on educational intervention showed no significant difference between pre-and post-intervention scores; [Absolute difference in the score: **3.3(-3.2 to 9.9); p-value=0.3**].

Table 5

Impact of the Educational Intervention on the Knowledge of BTL amongst Women in Bomet County

Variable	Pre-intervention	Post-Intervention	Difference[1]	95% CI	p-value
Score, Median (IQR)	67[50,83]	67[50,71]	3.3	[-3.2;9.9]	0.3

[1]Two sample t-test
CI-Confidence Interval

4.6 Discussion

The objectives of this study were to establish the demographics of women attending ANC and Family planning clinics in Bomet County, their knowledge about BTL and the effects of an educational intervention on the knowledge of BTL amongst women in the community. The author hypothesized that an educational intervention on BTL offered to a subset of the population in the community would cause a snowball effect of knowledge, by word of mouth, and would subsequently result in a measurable increase in the level of knowledge from another subset of women from the community. Word of mouth is a powerful tool in the practice of medicine and can play a major role in influencing up takers of certain services and products(Soare et al., 2022)

This was a novel study designed to intervene on one of the already established factors among many, that undermines the utilization of an effective method of limiting childbearing among women who have achieved the desired family size. This research was largely informed by the findings of the National Bureau of Statistics Nairobi (2015), which stated that among women aged 15-49, more than half desired to stop bearing children. In the same study, the uptake of BTL was established to be low at 1.7%, a significant difference compared to the Western world such as Europe where it is a leading method of contraception (Malas et al., 2018). Sub-Saharan Africa continues to suffer the magnitude of maternal mortality due to complications of labour and delivery as well as the implications of unwantedpregnancies (Amo-Adjei et al., 2019). Change in the domain of family planning can only happen with education. Educational interventions such as the use of videos, provide an easy and feasible design for effectively educating as well as empowering people on various health aspects. This is an important component for prevention and even response to situations, and in this study, response to the COVID-

19 outbreak(Kaim et al., 2020). Knowledge is a prerequisite to the consumption of any family planning method (Babalola & John, 2012). This study, therefore, has taken the active step of intervention, towards the achievement of SDGs, specifically number three which aims to promote good health and well-being for allby 2030 (Sampedro, 2021).

We established that most women interviewed in our study were below the age of 30, and they were still ongoing with childbearing. There was only one woman in the study found to be utilizing BTL. The majority of the women self-reported to be Christians, with only two out of the one hundred and sixty women reporting to be of the Islamic faith.Women did not report getting family planning information from their places of worship, in a study by Kinuthia (2013) factors influencing the uptake of bilateral tubal ligation among women who have completed family size in central and eastern provinces(unpublished manuscript) with a significant number reporting to get family planning advice from relatives. The women in this study were mostly reported to be of the Christian faith. This could imply an indirect impact on contraceptive utilization, by not fostering opendiscussion, which can negatively bias women on its utilization. There have also been reports of denial of tubal ligation at religious-affiliated hospitals (Mesfin &Kibret, 2016), a further barrier to its utilization.

This study has established a statistically significant relationship between the level of education and the knowledge of BTL. Women with post-secondary education were found to have higher knowledge scores as compared to those with lower levels of education. This was in line with Saad and Sharafeldeen's (2020), study that aimed at assessing the influence of direct interviews of postpartum women about their awareness and knowledge regarding contraception and modern contraceptive methods. He found in the analysis of demographics that ignorance, low financial status and cultural beliefs

affected knowledge about contraception options, in that, the more the woman was educated, the higher the likelihood of knowing more options for contraception. This was also similar to the financial status. Women with better financial standing had better knowledge and access to various options for family planning. Additionally, the study also found that a majority of women had education at least a High school level education.

The baseline survey in the current study has established that only 1% of women were utilizing BTL at the time, with injections as a method of contraception leading at 38.75%, followed by IUD at 10%. Another 38.75% of women were not on any family planning method at the time. This indicated that almost half of the women interviewed were still desiring to further their family sizes, although some were also still searching for an effective method or were in transition from one method to another. We also found that the average median age of women in this survey was 28.5 years with an average of 2.25 children. This finding could partly explain the participant's reluctance to use a method of contraception. The age of a woman plays a part in the decision of the method of contraceptive to use, with a majority of young women preferring short-acting methods. This however does not mean that these women do not require the knowledge for future use. Women must know the time they will need to make adjusted decisions. This survey confirms the findings of several studies. The KHDS 2015, indicated a finding of 1.7% of women utilizing BTL. This was a country-wide survey of all women of reproductive age 15-49 years, additionally, the mean number of children was at 3.6 and more than half of the women in this survey did not desire further childbearing. Our study had a mean of two children per woman. A study done in Uganda aimed at determining the uptake of female sterilization among women of reproductive age group found only 2% of women utilizing this method (Anita et al., 2020). In the same study, an

association of BTL utilization increased with an increase in parity, age, wealth and partner supportin making the decision. The findings on parity and age were similar to a study by Kinuthia (2013), who on the contrary found no relationship between socioeconomic characteristics and level of education to the uptake of BTL. In this study, 28% of women interviewed were utilizing BTL, a figure way above the national average. An explanation for this could be the fact that the inclusion criteria for the study were women who had already achieved the desired family size.

The role of men in the utilization of family planning methods cannot be underestimated. A study done in Togo (Koffi, et al 2018), established that men are generally supportive of their partners' use of contraception, and the reason cited in this study was socioeconomic. Some thought family planning could promote promiscuous behaviour. It was however noted that all men in this study showed interest in acquiring more knowledge on contraceptive use. The men also expressed that they preferred that the information was given to them by healthcare workers, but also learned from other men who were already using or supporting their partners in family planning. In our study, one hundred and twenty out of the total of a hundred and sixty women interviewed reported that they would seek the opinion of their spouses before deciding to have BTL. A similar finding was noted in a study by Makathini in KwaZulu South Africa, that 35% of 102 of the participants in the study could not go ahead and have BTL against their partner's wish. Due to the importance found on the role of men in influencing contraceptive uptake, the capital of Burkina Faso, quite populous, has acted in incorporating research-based evidence on family planning with insights on how men view contraception with strategies on how they can be more involved in family planning efforts. Some of the key findings and points of action include the socioeconomic motivation that can enhance men's interest in family planning. Another finding was that men were strongly opposed

to single-minded decision-making by women on family planning. Men in this analysis were also noted to harbour misconceptions, especially about modern methods of family planning. There were also concerns that there were very limited methods available for men, and associated lack of adequate venues that offer the same services. Indeed, any country's attempt at increasing contraceptive usage should address the concerns of men, especially about misconceptions. Additionally, any campaign done on family planning should not exclude men and in fact, should consider men who are already practicing family planning either by themselves or in support of their partners as cheerleaders.

One's socioeconomic environment can affect the promotion of healthy behaviour(Ackerson & Zielinski, 2017). Income can significantly determine access to health care services, in that low income is associated with less access to health care services and information (Dauda, 2012). Women may need to be economically strengthened, which is a result of good levels of education. Education is a main socioeconomic determinant of fertility decline. Investment in the education of women will therefore impact health behaviour, not only for themselves, but for the family and community at large. In a study looking at a minority population in New Zealand, there was evidence that the low socioeconomic status of the group of women studied limited their access to family planning. This community also had reported high rates of teenage pregnancies, a rate that was significantly higher than other parts of New Zealand that were considered economically empowered. This study also established that 83% of women who had secondary and tertiary level education believed that BTL reversal was guaranteed if one needed to conceive later in life. This was a contradiction to our current findings, which that showed women with post-secondary education had better knowledge scores. On the other hand, there were good knowledge scores on most other questions by participants with post-secondary education. It is important that programmes in Sub-

Saharan Africa and Kenya specifically where fertility rates are higher than desired (KHDS 2015), have programmes that focus on contraceptive education at the community level. The aim would be to aid women in achieving desired fertility status. It is, however, worth noting that, contrary to most studies, a survey done on the fertility trends and preferences in sub-Saharan Africa (Bongaarts, 2020), established that women in this region desired larger family sizes and that though most family planning programmes justify their role in educating to the high levels of unmet contraceptive needs, there is a perspective that even if all unwanted pregnancies could be halted in Sub-saharan Africa, that fertility would remain high. This survey concluded that family planning programmes do a lot more than limit unwanted pregnancies, but also have quite an effect in limiting wanted fertility.

Several studies have underscored that education level is key to influencing knowledge. The Earth Policy Institute data shows that women with at least primary level education have few, but healthy children (Brown,.2008). In yet another study conducted in Uganda, women who had post-secondary education had more contraceptive options and usage as compared to those who had no education at all. Education on family planning is best offered by healthcare workers. To be more effective and reach even more women, there is a need for the government to facilitate door-to-door education of men and women. It is not good practice to leave out the men in education, as they influence women's decision-making.On the demographics, it is worth noting that they play a key role in the counselling of BTL. More effort may need to be directed to patients with lower education levels and lower socioeconomic status. It is also important that the men are educated together with the women, to aid positively in the decision-making towards effective contraception. There is also a need to discuss family planning options in the churches, as women are likely to view the methods more positively. These steps will

enable women to make informed contraceptive decisions and avert the effects of unwanted pregnancies.

Knowledge is a prerequisite for an informed decision. This study aimed to intervene by way of education as pertains to BTL, a gap that has been identified in the literature review. Several educational interventions have been done with great success, addressing other topics in health and also in other fields. There was no bibliographic search that revealed a study intervening in the knowledge gap of BTL, locally and elsewhere. A study by Shen and Rudesill (2016) assessed the impact of an educational intervention on breastfeeding counselling behaviour among Obstetrics Gynaecology residents who had expressed a lack of confidence despite relatively good knowledge. In this study's post-interventional survey, there was a reported statistically significant increase in the rate of breastfeeding discussions with a positive trend for breastfeeding promotion. The resident's knowledge assessment tests, however, only increased marginally from 20 to 20.5 out of the 28 questions. Despite the non-statistically significant knowledge increment, there was a positive impact on the counselling behaviour.Whereas educational intervention is expected to translate to knowledge, the actual measure of knowledge gained may be through behaviour change. In the country of Benin, a study found that despite there being good knowledge of modern methods of contraception, there was still a rather big unmet need for family planning. The study established that there was little attention given to the social-normative barriers that influence the need and utilization of certain methods of contraception. In applying a social network theory, to reduce barriers that prevent the use of modern contraceptive methods, it was found that training influential people in the community who can encourage the dialogue about the unmet need for contraception, complemented by radio and service linkages had a great impact. This study supported the use of social and behavioural change strategies to

diffuse family planning ideas, new and old, within community and social networks, with the idea that one's social network approved certain methods of family planning. Men and women in this study reported that the knowledge that their social networks approved of family planning, significantly increased their chances of discussing the use of any method. This signifies that social networks can lead to new perceptions and thus influence change.

Overall, our study did not translate into statistically significant knowledge level increments between the pre and post-intervention phases. A look at various studies has shown the success of brief educational interventions that had the same cohorts in the pre and post-intervention phases. A study was done in Korea, by Jo et al. (2018), to determine the impact of an educational intervention, whose intervention involved sharing information on the knowledge of osteoporosis and the modifiable risk factors thereof among Korean patients aged >50 years who presented to outpatient clinic for osteoporosis. After the collection of anthropometric measures and other factors at baseline, the patients received education regarding risk factors at an individual level. A post-survey on the same patients conducted 3 months later comparing the pre-test and the post-test results showed a significantly improved knowledge score from the pre-education phase.A study conducted in Nigeria, by Abiodun et al. (2014), Quasi-experimental, with a pre-post study phase as well as a control group, aimed at establishing if there would be an increase in the knowledge and perception of cervical cancer screening in women. The study established that in the post-intervention phase, among the intervention group of women, the knowledge and perception were relatively better, but remained poor in the control group, but no significant difference between the groups was noted in terms of the willingness to have cervical screening. The study used a movie-based health education as their mode of communication to impart knowledge to

the participants. This study was able to establish a causal effect of the intervention on knowledge levels in the post-intervention phase, showing that an appropriately selected method of health intervention can increase knowledge and awareness in not only cervical cancer and its screening but this can be applied to other health issues.

In the line of contraception, studies have shown that an increase in contraceptive use and other behaviour changes may follow communication through media channels. In a study done in Tanzania, women who had been exposed to a media message on family planning were likely to use contraception, as opposed to those who had no recollection of a family planning message from any of the media sources ie radio, print or television (Jato et al., 1999). Noteworthy, for family planning, a single-time intervention may not be adequate to result in behaviour change. Additionally, the mode of education has an impact on the knowledge translation to the target population. In this effort to increase health literacy, studies show that population education may seem like an obvious solution, but therein are more complex issues that may require educational interventions to be designed using a well-established psychological and behavioural framework.

The Health belief model for instance has been utilized in the prediction of behaviour change in health practices, as implied in this study's conceptual framework. The theory revolves around some constructs, whose level of perception by the affected individual, is what is likely to inform their change in behaviour or not. The first construct is that of perceived susceptibility, the belief that one is likely to be affected by a certain condition. In our study, this could imply a woman getting pregnant against her wish, after having achieved her desired family size. The seriousness with which a woman sees this as an unwanted consequence will inform her eagerness to obtain an effective method of family planning in a timely fashion. The second construct is on perceived benefits, that of an

effective contraceptive method i.e. its efficacy and less user dependency can propel one to be willing to utilize a certain method. This study focuses on promoting the knowledge of the benefits of BTL, a vital component in behaviour change. The third construct is on perceived barriers, which is a potential deterrent to behaviour change. A woman willing to take up a method of contraception but is misinformed or negatively influenced by religion or culture, may end up having more children against her wish. The last construct is self-efficacy, the confidence that one can carry out the behaviour change needed to produce an outcome, in this case, making an informed decision to get BTL. This educational intervention is built on an already established susceptibility from prior studies, aimed at campaigning on benefits and allay any misconceptions as barriers. Behaviour change takes time, but knowledge is a stepping stone in the right direction. Knowledge may also need to be offered in multiple phases. The effects of this intervention may hence be seen years down the line, but again, with confounding biases that may mask the true association from the intervention.

CHAPTER FIVE

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

5.1 Introduction

In this chapter, the researcher will give a summary of findings as per the study objectives, and the conclusions drawn from the study. Gaps identified in the knowledge of BTL will be highlighted. Recommendations as to how education can be offered on the various family planning methods will be provided.

5.2 Summary of the Major Findings

The objectives of this study included identifying the knowledge level of women attending ANC and Family planning clinics in Bomet with their relevant demographics and later followed by the establishment of the impact of an educational intervention on the knowledge of BTL.

5.2.1 Social Demographic Characteristics of Women Attending ANC and Family Planning Clinics in Bomet County

Our study demographics mostly included women in the age range of 20-30, who were still early in their childbearing careers and did not desire a permanent method at the time. However, there was a significant improvement in the desire to utilize BTL once these women had achieved their desired family sizes, and this was noted in the post-educational survey. This could be attributed to the education gained and allaying fears fuelled by a lack of knowledge as well as myths associated with the procedure

5.2.2 Baseline Knowledge Level of BTL among Women attending ANC and Family Planning Clinics in Bomet County

There was relatively good knowledge identified in the baseline survey, with some gaps noted majorly on the failure rate of BTL and the possibility of an ectopic pregnancy if it did. Other significant knowledge deficits were noted in the fact that women thought that they would not be allowed to change their minds regarding BTL before the procedure was done, as well as the fact that BTL reversal was not guaranteed if one wanted to conceive later in life. Very few women were utilizing BTL as a method of contraception in the baseline survey. Women had moderate to good knowledge of the lack of protection from HIV and STIs by having a BTL done. The study established a significant relationship between education level and the knowledge of BTL, denoting that more time may need to be devoted to clients with lower educational attainment to achieve similar knowledge scores to their counterparts

5.2.3The Impact of an Educational Intervention among Women Attending ANC and Family Planning Clinics in Bomet County

Women were noted to be very receptive to the educational intervention and had questions even on other methods of contraception. This showed the need for more educational interventions on the various family planning methods. Overall the study established a paucity of knowledge that persisted even after the intervention. This could be attributed the stated study limitations.

5.3 Conclusion

The women interviewed in this study were young women, with low parity. They were shown to be desiring further child bearing, and some were in search of an effective short-

term method. Most women had achieved primary level education, were married and of Christian faith. This study focused on assessing baseline levels of knowledge, and again assessing knowledge levels after an educational intervention had been carried out.The study found that there was a poor baseline level of knowledge on BTL. Eagerness in the education concerning BTL showed an increased need for education on family planning methods, to help women make informed decisions and take up methods that fit them as well as allay any misconceptions associated with the various methods of family planning. The educational intervention showed no significant difference between pre-and post-intervention knowledge scores, hence no impact on the anticipated knowledge levels. The negative impact of the study may have predominantly been from the fact that the pre and post-intervention groups were different and that the people interviewed in the post-intervention phase may not have necessarily gotten the education either from the health facilities or from the community as had been hypothesized.

5.4 Recommendations

5.4.1 Policy Recommendations

i. The government should put more resources into ensuring women are formally educated; education directly impacts knowledge.

ii. Hospital structures that foster family planning education not only at the hospital level but also in the communities by teaming up with community health volunteers

iii. Hospitals, health centres and dispensaries should reserve time to openly discuss methods of contraceptives even in groups, as this would help with information sharing and women would also give experiences with clarifications done by healthcare workers. This would go a long way in the dissemination of correct

information to the community and subsequently informed uptake of suitable methods of contraception.

iv. Churches should also take a lead in educating men and women on the different family planning methods, and not just limit this talk to hospital settings.

5.4.2 Recommendations for Further Research

i. There is a need to conduct a similar educational intervention on a large scale and different family planning methods. This would relay the correct information to women in the community and would enhance the uptake of different family planning methods, hence women would achieve desired family sizes and limit the effect of unwanted pregnancies

ii. As a follow-up to this research, an assessment in later years of the uptake of BTL in the area of study; though a causal effect would be hard to establish

iii. A study that includes men as part of the educational intervention as they play a role in women's decision-making process

iv. A study that follows the same women in the pre and post-intervention phase as well as a control group, to establish a direct causal effect of the educational intervention.

v. A study of a similar nature that employs a social network theory

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Appendix I: Questionnaire

Validated BTL Questionnaire: English Translation

Age:

Parity:

Marital status:

Level of education:

Have you reached your target number of babies?

- Yes
- No

Do you want a permanent contraception in the form of BTL once your target is reached?

- Yes
- No

Does your religion allow you to have BTL?

- Yes
- No

Do you need to involve your spouse in the decision of BTL?

- Yes
- No

Can you still have BTL even if your spouse is against your decision?

- Yes
- No

Will BTL protect you from STIs/ HIV?

- Yes
- No

Is there a small risk of falling pregnant after BTL?

- Yes
- No

Can pregnancy occur outside your womb?

- Yes
- No

Are you allowed to change your mind about BTL before the procedure is done?

- Yes
- No

Will BTL negatively affect your sexual life

- Yes
- No

Is BTL reversal guaranteed if you need to conceive

- Yes
- No

What is your contraceptive alternative if BTL is not desired?

- Pills
- Injections
- Intrauterine contraceptive device

Validated BTL Questionnaire: Kipsigis Translation

Kenyiseguk : _____

Koitetablagoguk: _____

Kigituni-i? _____

Tian somaneng'ung'? _____

Kiriityikoitetablagokchekiimache?

- Ee
- Achicha

Tostatunimakyinigeitilsigisietenoretab BTL ye kagoyaminlagok?

- Ee
- Achicha

Toschamdoisautikwokanankaniseng'ung' ketillagokenoretab BTL?

- Ee
- Achicha

Tosyaacheoyanjineakchitang'ungkotomokeyaun BTL?

- Ee
- Achicha

Tosimuchitestaiicheng' keyaun BTL agotndaesioichitang'ung'?

- Ee
- Achicha

Tos terin BTL kot ko manamin HIV akmianwogikabchekinamndoigei?

- Ee
- Achicha

Tos mi ng'oiyondikitiginkeletogotimanachagot ye kagetillagokenoretab BTL?

- Ee
- Achicha

Tosimanachensang'utabruondabmo?

- Ee
- Achicha

Toskichamuniwalkabwatutigukagobo BTL ko maitkeyaunboisioniton-i?

- Ee
- Achicha

Tosng'emboisionitonbo BTL sobeng'ungnebokatuiyetabgeiakchitang'ung-i?

- Ee
- Achicha

Tos ta komuugaksekeweeksigisiet ye kageyaun BTL?

- Ee
- Achicha

Ngot ko memacheoretab BTL ko tosainonoret age ne igaigae?

- Ee
- Achicha

Validated BTL Questionnaire: Kiswahili Translation

Umri Wako: _____

Idadiya Watoto: _____

Kiwango cha Elimu: _____

Je, umefikiaidadiyawatotouliowataka?

- Ndio
- La

Je, utakapotoshekanaidadiyawatoto, utatakakukomeshakwanjiaya BTL?

- Ndio
- La

Je, imaniyadiniyakoinaruhusukutumianjiaya BTL?

- Ndio
- La

Je, ungetakakumhusishamwenzakowandoakablayakutumiampangowauzaziwa BTL?

- Ndio
- La

Je, mpangowauzaziwa BTL utakukingausipatwenamagonjwayazinaanavirusivya HIV/UKIMWI?

- Ndio
- La

Je, kunauwezekano wo wotekupataujauzitohatabaadayakufanyiwa BTL?

- Ndio
- La

Je, unawezakutungamimbanjeyanyumbayauzazi?

- Ndio
- La

Je, unawezakuruhusiwakubadilishauamuziwakokablayakufanyiwa BTL?

- Ndio
- La

Je, kufanyiwaopereshenihiiya BTL kutawezakuharibumaishayakoyakimapenzi?

- Ndio
- La

Je, baadayakufanyiwa BTL, nirahisitenakurudishahaliyauzazi?

- Ndio
- La

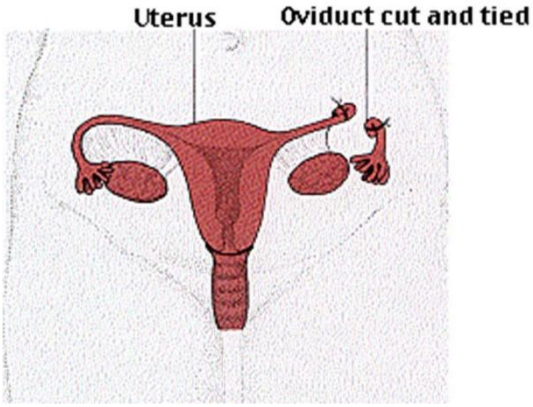
Ikiwahutakikufanyiwa BTL ninjiaganimbadalaambayoungependelea?

- Tembe
- Sindano
- Mpira

Appendix II: Education Manual

1. What is BTL

Involves cutting and tying the fallopian tubes in order to prevent the sperm from fertilizing the ovum that was released from the ovary, and reaching the uterine cavity



2. Who qualifies for BTL

There is no medical reason to not get a BTL

Women Who Should Not Use BTL

- Young women and women with no children - who are uncertain of their desire for future fertility.
- Women or girls who do not give voluntary informed consent; in situations where the client is mentally challenged, consent may be given by parent or guardian.

3. Benefits Vs risks

BTL is 99.9% effective in preventing pregnancy

ADVANTAGES OF BTL

Contraceptive Benefits

- Highly effective and safe

- Efficacy does not depend on the client's action.
- It is permanent.
- Has no effect on breast-feeding
- TL does not affect a woman's sexual desire, ability and performance
- It is cost effective after the initial procedure
- No significant long-term side effects. Other Benefits
- Women who have TLs have a decreased risk of getting ovarian cancer and have a possible decreased risk of PID.

LIMITATIONS AND SIDE EFFECTS OF BTL

Limitations:

- Does not protect against STIs and HIV.
- Generally irreversible—the success of reversal surgery cannot be guaranteed
- Procedure needs specially equipped facilities and trained personnel.
- Failure of procedure pre-disposes to ectopic pregnancy.
- Subjects client to pain and leaves permanent scar.
- The client needs to sign a consent
- Only adequately trained service providers can offer the method

There may be side effects associated with the surgical procedure Side effects include:

 Minimal risks and side effects of anesthesia

 Risks associated with surgical procedures

 Post procedural pain may be eexperienced.

Appendix III: Informed Consent Form

STUDY TITLE: The impact of an educational intervention on the knowledge of Bilateral Tubal Ligation (BTL) among women attending Antenatal and family planning clinics in Bomet county: 'An interventional Study'

Principal investigator: Ngigi Lydia Wangui

Affiliated Institution: Kabarak university

Co-investigators:

1. Dr. Nthusi Nthula, Kabarak university

2. Dr. Francis Muriithi, RCOG, UK

Introduction

You are invited to participate in this research study being undertaken by the above listed investigators. This form will help you gather information about the study so that you can voluntarily decide whether you want to participate or not. You are encouraged to ask any question regarding the research process as well as any benefit or risk that you may accrue by participating. After you have adequately been informed about the study, you will be requested to either agree or decline to participate. Upon agreeing to participate in the study, you will be further requested to affirm that by appending your signature/thumbprint on this form. Accepting or declining to participate in this study does not in any way waive the following rights which you're entitled to:

a) Voluntary participation in the study;

b) Withdrawing from the study at any time without the obligation of having to give an explanation and;

c) Access to services which you're entitled to

A copy of this form will be provided to you for your own records

Should I continue YES/NO

This study has been reviewed and approved by Kabarak University Research Ethics Committee (KUREC)

What is the Purpose of the Study?

The main reason for conducting this study is to answer the following questions:

1. To establish the knowledge level as pertains to Bilateral Tubal Ligation among women in Bomet county
2. To establish the impact of an educational intervention on the knowledge of Bilateral tubal ligation among women in Bomet county

In Case You Agree to Participate in the Study, What Will Happen?

This is what is going to happen once you have agreed to participate in the study:

- First, no changes in care will happen. The questionnaire filling will happen after triage, and there will be a delay of about 5-10minutes used to fill in the questions
- Second, a qualified and well-trained interviewer will ask you questions in a private place where you will feel comfortable. In case there is any question you feel uncomfortable responding to, you will not be coerced to respond. The questions will be on the following areas:

Knowledge of BTL

Attitude towards BTL

Perception of BTL

- Third, after the interview, there will be no follow up for research purposes
- Last, you are requested to provide your contact details (phone number or any other reliable form of contact). This will help reach you in case new information regarding the study emerges.
- The contact details you will provide shall remain confidential to the lead researcher (PI).

What Potential Risks are Associated with Participation in this Study?

There are minimal potential risks anticipated in the course of this study, but in the event of an unlikely emotional or psychological harm to the patient, it will be mitigated by ensuring appropriate medical consultation and counselling services are immediately

availed by physicians, chaplains, and psychiatric/counselling nurses or clinical officers, in cases of any emotional distress or mental breakdown during the interview process

Privacy & Confidentiality

Privacy is the right of an individual to have some control over how his or her personal information/data is collected, used, and/or disclosed. Confidentiality is the duty to ensure information (data) is kept secret only to the extent possible/reasonable.

Critical patient information contained in the filled questionnaires shall be protected by exercising confidentiality. They shall be stored in a locked and sealed box to avoid possible retracement of key identifiers of the study participants, as well as tampering with the completed questionnaires potentially by the research assistants.

These filled questionnaires will only be made available to the principal investigator, supervisors, and statistician as needed. After analysis, the questionnaires will be stored in a safe place under lock and key for a minimum of 10 years or until the University archivist approves the need to discard the data by shredding and burning.

The principal investigator will share the findings of the study through various hospital forums and platforms to disseminate the results for education purposes as well as inform of future research areas to help shape health care policies.

In case you aren't comfortable answering any of the questions during the interview because of feeling embarrassed or uncomfortable, it will be within your rights to decline. Otherwise every measure has been taken to ensure that the interview is conducted in a private area with minimal to no interference so that you feel comfortable.

If at all you suffer any injury, illness or complication(s) by participating in this study, kindly contact us immediately using the contact details provided at the bottom of this form. you will be attended to by the study clinician and if there is need for further assessment or treatment you will be referred accordingly

What Benefits are you going to Accrue by Participating in the Study

Increment of knowledge on Bilateral Tubal Ligation as a safe and effective method of contraception in those who do not desire further child bearing

Empowered women on effective contraceptive option to limit childbearing, which will lead to better health for the women, reduced infant mortality rate and will also favor career development and subsequent economic empowerment

What Will it Cost You to Participate in the Study?

A slight time delay of about 5-10 minutes

There will be no extra financial cost

In Case I Have any Further Questions/ Concerns in Future Whom Should I Contact?

Ngigi Lydia Wangui, phone number 0723139129

In the event that you need further clarification or questions regarding your continued participation in the study feel free to contact the PI { **Ngigi Lydia Wangui, phone number 0723139129)**

In case of concerns regarding your rights and/or obligations as a research participant do not hesitate to contact the secretary, KUREC on {kurec@kabarak.ac.ke 0723707484}

What Alternative Options are Available to Me?

The decision on whether to participate or not is absolutely voluntary. You will be free to withdraw from the study at any point during the study without providing any explanation.

How Will the Findings of this Study be Communicated or Shared?

The principal investigator will share the findings of the study through various hospital forums and platforms to disseminate the results for education purposes as well as inform of future research areas to help shape health care policies.

Statement of Consent

I have comprehensively read the consent form or/the information has been comprehensively read to me by the researcher. I have understood what the study is about and all the questions and concerns that I had have been responded to in a clear and concise manner. The study benefits and foreseeable risks have been explained to me. I totally understand that my decision to participate in this study is voluntary and I have the right to withdraw at any point during the study.

I freely consent to participate in this study

Signing this form does not in any way imply that I have given up the rights am entitled to as a participant

I agree to participate in this research
YES_____NO_____

Participant's Signature/Thumb print_____ Date _____

Participants name

Participants phone number

Appendix IV: Letter of introduction

KARARAK UNIVERSITY
OFFICE OF THE DIRECTOR
INSTITUTE OF POST GRADUATE STUDIES

Private Bag - 20157
KABARAK, KENYA
http://kabarak.ac.ke/institute-postgraduate-studies/
E-mail: directorpostgraduate@kabarak.ac.ke

16TH February 2023

The Director General
National Commission for Science, Technology & Innovation (NACOSTI)
P.O. Box 30623 – 00100
NAIROBI

Dear Sir/Madam,

RE: LYDIA NGIGI WANGUI - GMMF/M/2695/09/18

The above named is a student at Kabarak University. She is carrying out a research entitled **"The Impact of an Educational Intervention on the Knowledge of Bilateral Tubal Ligation (BTL) among Women Attending Antenatal and Family Planning clinics in Bomet County: An Interventional Study"**

The student has been granted approval for ethical clearance by Kabarak University Research Ethics Committee and is ready to undertake field research.

Kindly provide the student with a research permit to enable her to undertake the research.

Thank you.

KABARAK UNIVERSITY DIRECTOR POST GRADUATE STUDIES 16 FEB 2023 PRIVATE BAG 20157, KABARAK

Dr. Nehemiah Kiplagat
Ag. Director, Institute of Postgraduate Studies

Kabarak University Moral Code
As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord. (1 Peter 3:15)

Kabarak University is ISO 9001:2015 Certified

Appendix V: KUREC Approval Letter

KABARAK UNIVERSITY RESEARCH ETHICS COMMITTEE

Private Bag - 20157
KABARAK, KENYA
Email: kurec@kabarak.ac.ke

Tel: 254-51-343234/5
Fax: 254-051-343529
www.kabarak.ac.ke

OUR REF: KABU01/KUREC/001/01/02/23

Date: 7th February, 2023

Lydia Ngigi Wangui,
Reg. No: GMMF/M/2695/09/18
Kabarak University,

Dear Lydia,

RE: THE IMPACT OF AN EDUCATIONAL INTERVENTION ON THE KNOWLEDGE OF BILATERAL TUBAL LIGATION (BTL) AMONG WOMEN ATTENDING ANTENATAL AND FAMILY PLANNING CLINICS IN BOMET COUNTY: AN INTERVENTIONAL STUDY

This is to inform you that ***KUREC*** has reviewed and approved your above research proposal. Your application approval number is ***KUREC-010223.*** The approval period is ***7/02/2023 – 7/02/ 2024.***

This approval is subject to compliance with the following requirements:

i. All researchers shall obtain an introduction letter to NACOSTI from the relevant head of institutions (Institute of postgraduate, School dean or Directorate of research)
ii. The researcher shall further obtain a RESEARCH PERMIT from NACOSTI before commencement of data collection & submit a copy of the permit to **KUREC.**
iii. Only approved documents including (informed consents, study instruments, MTA Material Transfer Agreement) will be used
iv. All changes including (amendments, deviations, and violations) are submitted for review and approval by ***KUREC***;
v. Death and life-threatening problems and serious adverse events or unexpected adverse events whether related or unrelated to the study must be reported to ***KUREC*** within 72 hours of notification;
vi. Any changes, anticipated or otherwise that may increase the risk(s) or affected safety or welfare of study participants and others or affect the integrity of the research must be reported to ***KUREC*** within 72 hours;
vii. Clearance for export of biological specimens must be obtained from relevant institutions and submit a copy of the permit to KUREC;
viii. Submission of a request for renewal of approval at least 60 days prior to expiry of the approval period. Attach a comprehensive progress report to support the renewal and;
ix. Submission of an executive summary report within 90 days upon completion of the study to ***KUREC***

Sincerely,

Prof. Jackson Kiteu PhD.
KUREC-Chairman

KABARAK UNIVERSITY
INSTITUTIONAL [illegible] ETHICS COMMITTEE
[illegible] 2023
APPROVED
P. O. PRIVATE BAG - 20157, KABARAK

Cc Vice Chancellor
DVC-Academic & Research
Registrar-Academic & Research
Director-Research Innovation & Outreach
Institute of Post Graduate Studies

As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord. (1 Peter 3:15)
Kabarak University is ISO 9001:2015 Certified

Appendix VI: NACOSTI Research Permit

REPUBLIC OF KENYA

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Ref No: 831260

Date of Issue: 16/March/2023

RESEARCH LICENSE

This is to Certify that Dr.. Lydiah Wangui Ngigi of Kabarak University, has been licensed to conduct research as per the provision of the Science, Technology and Innovation Act, 2013 (Rev.2014) in Bomet on the topic: The impact of an educational intervention on the knowledge Bilateral tubal ligation(BTL) among women attending antenatal and family planning clinics in Bomet county: An interventional study for the period ending : 16/March/2024

License No: NACOSTI/P/23/24099

831260

Applicant Identification Number

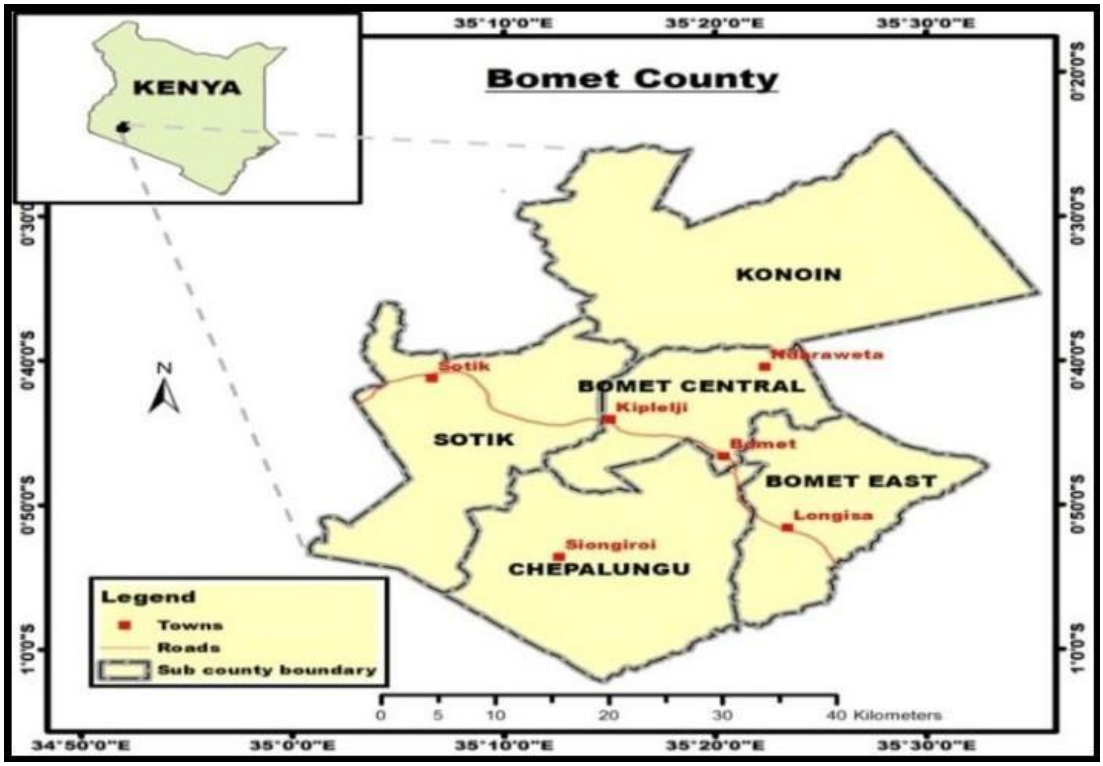
Director General
NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY & INNOVATION

Verification QR Code

NOTE: This is a computer generated License. To verify the authenticity of this document, Scan the QR Code using QR scanner application.

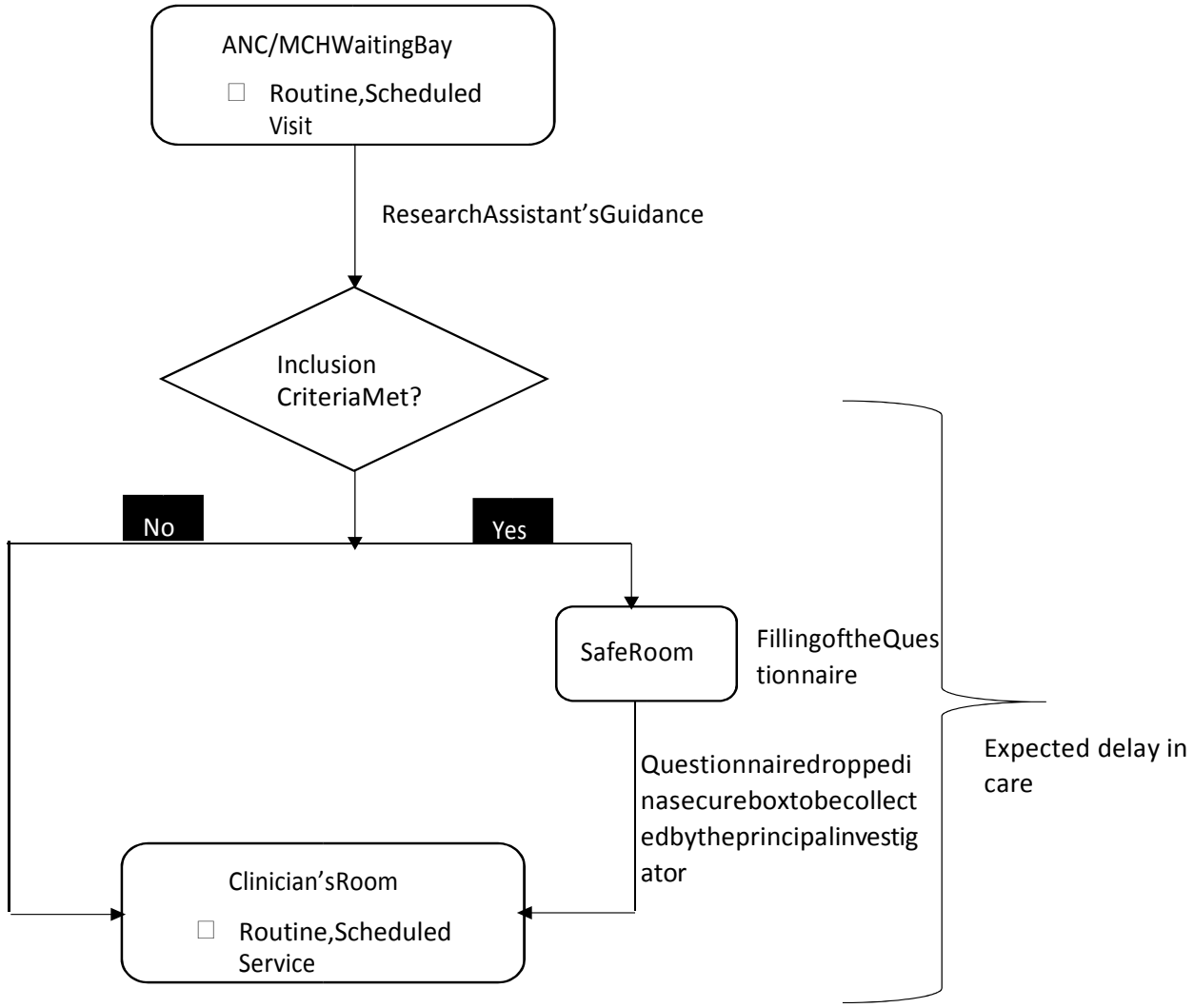
See overleaf for conditions

Appendix VII: Map of Bomet County

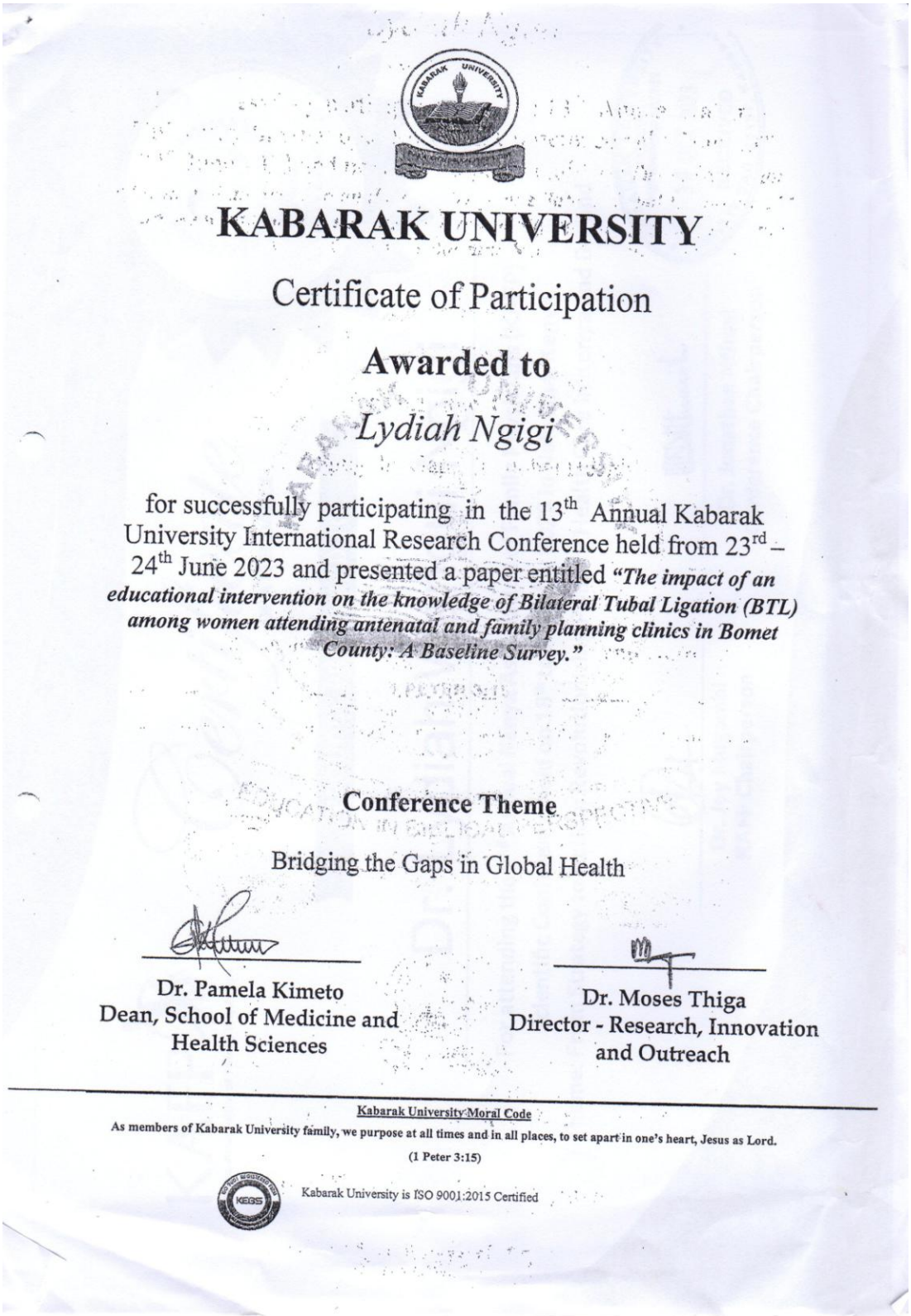


Adopted from Kenya Independent Electoral and Boundaries Commission (2012)

Appendix VIII: Study Participant Flowchart



Appendix IX: Evidence of Conference Participation



KABARAK UNIVERSITY

Certificate of Participation

Awarded to

Lydiah Ngigi

for successfully participating in the 13th Annual Kabarak University International Research Conference held from 23rd – 24th June 2023 and presented a paper entitled ***"The impact of an educational intervention on the knowledge of Bilateral Tubal Ligation (BTL) among women attending antenatal and family planning clinics in Bomet County: A Baseline Survey."***

Conference Theme

Bridging the Gaps in Global Health

Dr. Pamela Kimeto
Dean, School of Medicine and Health Sciences

Dr. Moses Thiga
Director - Research, Innovation and Outreach

Kabarak University Moral Code

As members of Kabarak University family, we purpose at all times and in all places, to set apart in one's heart, Jesus as Lord.

(1 Peter 3:15)

Kabarak University is ISO 9001:2015 Certified

Appendix X: List of publications

KABARAK JOURNAL OF RESEARCH & INNOVATION

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Tel: 254-51-343234/5
Fax: 254-051-343529
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OUR REF: KABU01/KJRI/07/07/31

10th November, 2023

Dear L. Wangui,

SUBJECT: PAPER ACCEPTANCE

We are pleased to let you know that your submission to Kabarak Journal of Research & Innovation (KJRI) has been accepted for publication. Details of the submission are as follows:

TITLE

THE IMPACT OF AN EDUCATIONAL INTERVENTION ON THE KNOWLEDGE OF BILATERAL TUBAL LIGATION AMONG WOMEN ATTENDING ANTENATAL AND FAMILY PLANNING CLINICS IN BOMET COUNTY: AN INTERVENTIONAL STUDY

AUTHORS

Lydiah WANGUI NGIGI, Francis MURIITHI GITHAE, and Jonathan NTHUSI

ISSUE

No. 4(2023)

VOLUME

Vol. 4

Congratulations on this achievement and thank you so much for choosing KJRI.

Thank you.

Sincerely,

Dr. Michael N. Walekhwa
Editor in Chief