DETERMINANTS OF DISCONTINUATION OF FIVE-YEAR IMPLANT AMONGST WOMEN OF REPRODUCTIVE AGE IN SELECTED HEALTH FACILITIES OF NAIROBI COUNTY, KENYA

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REG NO. P57/CTY/PT/23692/2011

A THESIS SUBMITTED IN PARTIAL FULFILLMENT OF THE REQUIREMENTS FOR THE AWARD OF THE DEGREE OF MASTERS IN PUBLIC HEALTH (MPH) IN THE SCHOOL OF PUBLIC HEALTH OF KENYATTA UNIVERSITY

MAY 2016
DECLARATION

Student’s Declaration

This thesis is my original work and has not been presented for a degree or any other award in any University.

Signature………………………………………………….. Date……………………………………

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Supervisors’ Approval

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DEDICATION

This work is dedicated to my lovely wife, Nancy and our precious daughters, Kui and Kenyanya whose love and patience have been a great source of inspiration.
ACKNOWLEDGMENT

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## ABBREVIATIONS AND ACRONYMS

<table>
<thead>
<tr>
<th>Abbreviation</th>
<th>Description</th>
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<tbody>
<tr>
<td>APHRC</td>
<td>African Population Health and Research Centre</td>
</tr>
<tr>
<td>CBD</td>
<td>Community-Based Distributor</td>
</tr>
<tr>
<td>CBS</td>
<td>Central Bureau of Statistics</td>
</tr>
<tr>
<td>CPR</td>
<td>Contraceptive Prevalence Rate</td>
</tr>
<tr>
<td>FP</td>
<td>Family Planning</td>
</tr>
<tr>
<td>IEC</td>
<td>Information, Education and Communication</td>
</tr>
<tr>
<td>IUCD</td>
<td>Intra-Uterine Contraceptive Device</td>
</tr>
<tr>
<td>KDHS</td>
<td>Kenya Demographic Health Survey</td>
</tr>
<tr>
<td>DRH</td>
<td>Division of Reproductive Health</td>
</tr>
<tr>
<td>KURHI</td>
<td>Kenya Urban Reproductive Health Initiative</td>
</tr>
<tr>
<td>LAM</td>
<td>Lactational Amenorrhoea Method</td>
</tr>
<tr>
<td>LNG</td>
<td>Levonorgesterel</td>
</tr>
<tr>
<td>SHBG</td>
<td>Sex Hormone Binding Globulin</td>
</tr>
<tr>
<td>UNPD</td>
<td>United Nations Population Division</td>
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<td>WHO</td>
<td>World Health Organization</td>
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DEFINITION OF OPERATIONAL TERMS

**Contraception**- The intentional prevention of conception or impregnation of conception through the use of various devices, agents, drugs, sexual practices or surgical procedures.

**Implanon**- A one-rod implant contraceptive inserted under the skin of a woman’s upper arm that is effective for three years in preventing pregnancies and contains the hormone etonogestrel.

**Implants**- These are small rods inserted under the skin of a woman’s upper arm to release the hormone progestin slowly to preventing pregnancy.

**Jadelle**- A two-rod implant contraceptive inserted under the skin of a woman’s upper arm that is effective for five years preventing pregnancies and contains the hormone levonorgestrel.

**Menopausal**- A point when a woman no longer has menstrual periods. At this stage, the ovaries have stopped releasing eggs and producing most of their estrogen. Menopause is diagnosed when a woman has gone without her normal monthly menstrual period for a duration of 12 consecutive months.

**Norplant**- A six-rod implant contraceptive inserted under the skin of a woman’s upper arm and is effective for five years and contains the hormone levonorgestrel.
ABSTRACT

Levels and trends in contraceptive use in Kenya underscore the need to examine the dynamics of contraceptive use in the country. The contraceptive prevalence rate has been on the increase from 7% in 1978 to 58% in 2014. Similarly, implant contraceptive prevalence rate has increased from 0% in 1993 to 9.9% in 2014. As the CPR increases, current and potential users of family planning are increasingly drawn from women with a past history of contraceptive use. This implies that a further increase in the CPR is more dependent on promotion of continuation rates and re-adooption of contraception among past users than it will be on promotion of new acceptance rates. As such, this study aimed at determining factors leading to the discontinuation of the 5-year two rod implant contraceptive amongst women of the reproductive age in Nairobi County in order to understand its effectiveness in enabling clients fulfill their reproductive goals. It was also to establish the average duration of use of such implants and determine the implant contraceptive switching trend. To achieve the objectives, a descriptive cross-sectional study was conducted with a desired sample size of 384 respondents employing quantitative parameters for a period of three months. The study determined exposure to the implant and simultaneously determined the main reason for its discontinuation in the target population. Simple random sampling was used to select Kamukunji, Njiru and Embakasi sub-counties of Nairobi. Convenient sampling was used to select seventeen health facilities in these sub-counties where the study was undertaken. Data was collected using a standardized interviewer guide which had been pre-tested in Kasarani sub-county of Nairobi. The data was then entered and analyzed using the Epi info computer program. Pearson’s Chi-square and logistic regression was computed to determine if there were relationships between the dependent and independent variables. At the end of the study, a total of 377 randomly selected respondents were interviewed. It was determined through bivariate analysis that spousal discussion with a p-value of 0.00039, number of living children a woman has with a p-value of 0.0003, duration of implant use with a p-value of 0.01 and number of years since her last delivery with a p-value of 0.0001 were significantly associated with implant discontinuation. The logistic regression analysis further determined that spousal discussion and a woman’s number of living children were the strongest predictors of the five-year implant discontinuation. The average duration of implant use was 19.3 months; short-term contraceptives were the most preferred contraceptives both prior to implant insertion and discontinuation and 74.5% of the respondents’ required further contraception after the discontinuation implying that the implant was unable to fulfill their reproductive goals. Thus, the factors identified as the major contributors of the discontinuations should be a key concern to family planning programmers and the Ministry of Health in general and should be addressed for strengthen continued implant use.
CHAPTER 1: INTRODUCTION

1.1 Background to the study

To attain a balance between resources and population, Kenya’s population policy promotes family planning thus contraceptive use as an entitlement that is based on an informed and voluntary choice. The contraceptive prevalence rate in Kenya is 58% with modern methods accounting for 53.2% and traditional methods accounting for 4.8%. The contraceptive method mix nationally is injectables 45.5%, pills 13.8%, female sterilization 5.5%, implants 17.1%, male condom 3.8%, LAM 0.2%, IUD 5.9%, rhythm method 6.6% and the withdrawal method at 1.2% (KNBS, 2015). The CPR of Nairobi stands at 62.6% with the contraceptive method mix been 20% pills, 37.7% injectables, 5.3% male condoms, 7.2% IUCD, 19.3% implants, 3.2% female sterilization, 0.2% vasectomy, 5.1% rhythm and 0.5% withdrawal method (KNBS, 2015). Implant use in Nairobi increased from 0% in 1993 to 19.3% in 2014 and is more common in women of between 15-29 years of age (KNBS, 2015).

However, one-third, one-half, and two-thirds of women who initiate use of contraception discontinue within 12, 24 and 36 months of initiation respectively. Abandonment of contraceptive use while still in need of contraception and contraceptive failure account for 65% of all discontinuations and 60% of discontinuations occur during the first 36 months of use (KNBS, 2015). Globally, the first-year five-year implant discontinuation rate is 11.7 per 100 women, the three-year cumulative rate is 39.4 per 100 women and the five-year cumulative rate is 58.5 per 100 women (Sivin et al., 2002).
These groups of women who discontinue contraceptive use due to involuntary factors represent the potential impact that family planning programs and this study will have on the CPR by maintaining a pool of satisfied clients and ensuring women attain their reproductive goals (APHRC, 2001).

1.2 Problem statement

In Kenya, the five-year implant contraceptive prevalence rate has increased from 0% in 1993 to 17.1% in 2014 and in Nairobi, it has similarly increased from 0% in 1993 to 19.3% in 2014. It is the third commonly used contraceptive method in Nairobi (KNBS 2015). Thus, the family planning program in Nairobi is increasingly dealing with a population that has had some experience with the implant contraception. The overall contraceptive discontinuation is very high at 60% within 3 years but the five-year implant discontinuation trends and levels remain largely unknown in Nairobi.

1.3 Justification

Given the high overall contraceptive discontinuation rates in Kenya, it is important to determine the factors leading to the discontinuation of the 5-year two rod implant contraceptive in order to understand its effectiveness in enabling clients fulfill their reproductive goals and to strengthen the implant family planning program in Kenya since as the CPR increases, unwanted and mistimed pregnancies would increasingly result from discontinuation rather than failure to use contraception at all (KNBS, 2015).
1.4 Research questions

i. What factors influence the discontinuation of the five-year implant amongst women of the reproductive age in Nairobi, Kenya?

ii. What is the average duration of use before discontinuation of the five-year implant amongst women of the reproductive age in Nairobi, Kenya?

iii. What was the prior contraceptive used before the five-year implant insertion and future contraceptive use plan if any amongst women of the reproductive age discontinuing the five year implant in Nairobi, Kenya?

1.5 Null hypothesis

There are no significant factors influencing discontinuation of the five-year two rod implant amongst women of the reproductive age in Nairobi County, Kenya.

1.6 Objectives

1.6.1 General objective

To determine the factors influencing the discontinuation of the 5-year two rod implant discontinuation amongst women of the reproductive age group in Nairobi County, Kenya.

1.6.2 Specific objectives

i. To determine the factors leading to the five-year implant discontinuation amongst women of the reproductive age in Nairobi, Kenya?
ii. To determine the average duration of use of the five-year implant amongst women of the reproductive age in Nairobi, Kenya?

iii. To determine the prior contraceptive used before the five-year implant insertion and subsequent contraceptive use if any amongst women of the reproductive age discontinuing using the five year implant in Nairobi, Kenya?

1.7 Significance of the study

As CPR increases, current and potential users of family planning are increasingly drawn from women with past contraceptive use, implying that further increases in the CPR is more dependent on promotion of continuation rates and re-adoption of contraception among past users than it will be on promotion of new acceptance rates because unwanted and mistimed pregnancies would increasingly result from discontinuation of methods rather than failure to use contraception at all. Thus, knowledge generated from this study helps in the development of policies and family planning programs that will enable the five-year implant user attain her contraceptive need. It is also expected to narrow the gap that currently exists on the five-year implant discontinuation specifically in Nairobi since little research has been undertaken in this area.
1.8 Limitations and delimitations of the study

1.8.1 Limitations

Findings of the study are limited to five-year implant users attending public health facilities and may not represent views from those of non-public health facilities five-year implant users who may have divergent views. It was assumed that the study participants would be available for the study to provide accurate data.

1.8.2 Delimitations

No significant studies targeting women in Nairobi using the five year implant and wanted to discontinue such implant use had been documented.
1.9 Conceptual framework

Several factors play a role in determining the continuation/discontinuation of the five-year implant. These are independent and intermediate factors may be inter-related and contribute to implant discontinuation as indicated by the conceptual framework below.

![Conceptual Framework Diagram]

**Figure 1.1: Conceptual framework**

*Constructed from literature review.*
CHAPTER 2: LITERATURE REVIEW

2.1 Introduction

Contraceptive methods are generally categorized as either modern or traditional methods. The modern methods are female sterilization, vasectomy, the pill, intra-uterine device (IUD), injectables, implants, male condoms, female condoms, lactational amenorrhoea, and emergency contraception while the traditional methods are rhythm or calendar method and withdrawal method (WHO, 2012).

Prior to the development of these contraceptives, women had to rely on male withdrawal, crude infanticide or abortion for contraception. Condoms were first used in 3000 BC and were made of such materials as fish bladders, linen sheaths and animal intestines. The first oral contraceptive was invented by Frank Colton in 1960. The IUCD was developed in the 1960s while the hormonal birth control methods expanded to include implants and injectables in the 1980s and 1990s. The 1990s were characterized by rapid expansion in safety and effectiveness of contraceptives including the introduction of the hormonal patch, vaginal ring, new injectables and transcervical female sterilization. The 5-year implant was first used in humans in 1974 and was initially a six capsule contraceptive drug delivery system developed by the population’s council biomedical research laboratories. It was replaced in 1996 by a two-rod implant to ease the insertion and removal procedures (Sivin et al., 2002).
2.2 World Health Organization Medical Eligibility Criteria for contraceptive users

The World Health Organization recognizes four main categories of contraceptive users (WHO 2009). The first category is for users with conditions for which there are no restrictions on the use of a particular contraceptive. The second category is for users with conditions for which the advantages of using the contraceptive method generally outweigh the theoretical or proven risks. In most situations the contraceptive method can be used freely but careful follow-up might be required. The third category is for users with conditions for which the theoretical or proven risks usually outweigh the advantages of using the contraceptive method. In this case, use of the method is not usually recommended unless other more appropriate alternative methods are not available or acceptable. The fourth category is for users whose conditions present an unacceptable health risk if the contraceptive method is used. Thus, the method should not be used. Contraceptive service providers should use their clinical acumen to categorize the eligibility of a client to use a particular contraceptive method (WHO, 2009). In Kenya’s diverse settings that differ in resource availability and levels of provider training and skills, the eligibility criteria must be adopted to the local situation taking into consideration levels of clinical judgment (MOPHS, 2010).

2.3 Global contraceptive trends and levels

The contraceptive prevalence rate globally stands at 63%. It is higher in the developed countries at 70% than in the developing countries at 62%. The sub-Saharan African region has the lowest CPR at 21%. It is 67% in Asia, 72% in Latin America and the Caribbean, 73% in North America, 71% in Europe and 72% in Oceania (UNPD, 2009).
Ninety per-cent of users use a modern method with short acting and reversible methods being preferred in the developed countries whereas longer acting methods are preferred in the developing countries. Female sterilization is the most commonly used method globally at 20% followed by IUD at 14% with the pill third at 9%. The injectables and the implants are used by 3.7% of the world’s population (UNPD, 2009).

2.4 Methods of contraceptives available in Kenya

The modern methods are all available in Kenya and these are female sterilization, vasectomy, the pill, intra-uterine device (IUD), injectables, implants, male condoms, female condoms, lactational amenorrhoea, and emergency contraception. The two traditional methods are also available and these are rhythm or calendar method and the withdrawal method (MOPHS, 2010). However, due to Kenya’s diverse settings that differ in resource availability and levels of provider training and skills, methods available at the various health facilities vary according to the health facility capacity (MOPHS, 2010).

2.5 Kenya’s contraceptive trends and levels

The CPR in Kenya has increased from 7% in 1978 to 58% in 2014 due to increased use of modern methods (KNBS, 2015). The modern methods account for 53.2% and traditional methods account for 4.8%. The method mix of contraceptives nationally is female sterilization 5.5%, pills 13.8%, IUD 5.9% injectables 45.5%, implants 17.1%, LAM 0.2%, male condoms at 3.8%, rhythm 6.6% and withdrawal at 1.2% (KNBS, 2015) while that of Nairobi is 20% pills, 37.7% injectables, 5.3% male condoms, 7.2% IUCD, 19.3% implants, 3.2% female sterilization, 0.2% vasectomy, 5.1% rhythm and 0.5% the
withdrawal method. Its CPR stands at 62.6% (KNBS, 2015). Implant use has increased from 0% in 1993 to 19.3% in 2014 in the county of Nairobi and is more common in women of between 15-29 years (KNBS, 2015).

2.6 Types of implants

Implants are small rods inserted under the skin of a woman’s upper arm to release the hormone progestin slowly thus preventing pregnancy. Three types of implants that have been approved for use in Kenya and these are the jadelle which is a two-rod implant containing 75mg/rod levonorgesterel as the active hormone and is effective as a contraceptive for five years; the implanon is a one-rod implant containing 68mg of the hormone etonogestrel and is effective as a contraceptive for three years and the sino-implant (zarin) is a two-rod implant containing 75mg/rod levonorgesterel as the active hormone and is an effective as a contraceptive for four years (MOPHS, 2010).

2.7 Physiology of the five-year implant

The five-year implant contraceptive is a set of two flexible cylindrical rods consisting of a dimethylsiloxane/methylvinylsiloxane copolymer core enclosed in thin-walled silicone tubing. Each rod contains 75 mg of the progestin levonorgestrel. The core of each rod is a mixture, half of levonorgestrel, half of the elastomer. The rods are sealed with polydimethylsiloxane adhesive and sterilized. Each rod is approximately 2.5 mm in diameter and 43 mm in length. It is a progestin-only product and does not contain estrogen. The sole active ingredient in the rods is levonorgestrel (−)-13-ethyl-17-hydroxy-18, 19-dinor-17□-pregn-4-en-20-yn-3-one with a molecular weight of 312.45.
hormone is a synthetic and biologically active progestin that exhibits no significant estrogenic activity and is highly progestational. It is delivered subdermally, is not subject to a “first-pass” effect through the liver and is virtually 100% bioavailable (Back et al., 1981). Release of the hormone sufficient to prevent conception is reached within 24 hours after placement of the rods and is maintained at an effective rate for five years. First-month pregnancies may occur if the implants are placed sufficiently late in the follicular stage so that ovulation is not blocked. Diffusion of levonorgestrel from the rods provides a continuous low dose of the progestin. The calculated mean in vivo release rate of levonorgestrel provided by the implant is 100 μg/day at one month, declining to 40 μg/day at 12 months and to 30 μg/day at 24 months, stabilizing thereafter at 30 μg/day. It is delivered directly into interstitial fluids from the subcutaneous implants. Mean levonorgestrel concentrations slowly decline to 435 ±172 pg/mL at one month, 357±155pg/mL at six months, and 280±123 pg/mL at three years. Concentrations at four and five years are similar to those at three years (Sivin et al., 2001).

Serum levonorgestrel concentrations show considerable variation among women, depending on individual metabolic clearance rates, body weight, and other factors. The concentrations are inversely related to body weight. Some individual variations like fibrous encapsulation, local capillarity or local body fat may reduce levonorgestrel release from the implants (Weiner et al., 1976). Approximately half is bound to albumin and a little less is bound to sex hormone binding globulin. Though its metabolic pathways have been only partially delineated, 16ß hydroxylation is one of the identified pathways of metabolism. Concentrations of metabolites in circulation soon exceed those of
levonorgestrel, mostly as conjugated sulfates. Metabolic clearance rates may differ among individuals by several accounting in part for the wide variation observed in levonorgestrel serum concentrations among implant users (Sivin et al., 2002). The main mechanisms of action of the five-year implant in preventing pregnancy are ovulation inhibition and thickening of the cervical mucus, thus preventing passage of sperm into the uterus (Brache et al., 1990). It is effective through five years (Meirik et al., 2001).

2.8 Effects of the five-year implant

Side effects that may occur while using the five-year implant include bleeding irregularities since the implant contains no estrogen, disruption of the menstrual cycle is the method’s predominant side effect. Most women can expect some variation in menstrual bleeding patterns such as irregular menstrual bleeding, prolonged episodes of bleeding, spotting between periods, no bleeding at all for several months or a combination of these patterns (Sivin et al., 1997). The kind of menstrual change a woman will have with implant is unpredictable. But, for most women, these menstrual irregularities diminish gradually with continued use (Biswas et al., 1996). If an unexpected pregnancy occurs the rods should be removed immediately. Other adverse events reported by more than 10% of women are pain, discoloration or other skin reactions at the implant site, dizziness, headache, leukorrhea, mastalgia, nausea, pelvic pain, urinary tract symptoms/infection, vaginitis and weight increase. Ovarian cysts or delayed follicular atresia sometimes occur with implant users. The average weight change over five years of use is a gain of about 9 pounds. Approximately 20% of women gain at
least 10 pounds in the first year and 50% gain at least 10 pounds by the end of the fifth year of use (Sivin et al., 2002).

2.9 Implant insertion and removal

The rods are inserted just below the skin of the woman’s inner upper arm through a small incision made either with a scalpel or a disposable pre-loaded inserter. They are placed in the shape of a V-opening toward the shoulder and should be inserted within seven days after the onset of menstrual bleeding to make sure the woman is not pregnant or immediately following an abortion. If they are inserted at any other time in the menstrual cycle, the possibility of a pre-existing pregnancy must be ruled out and a non-hormonal contraceptive method must be used for at least seven days following insertion to avoid pregnancy (Sivin et al., 2002).

Removal is achieved through an incision close to the rods, may take longer, be more difficult, cause more pain than insertion and may be associated with difficulty in locating implants (WHO, 1990). Additional incisions and/or office visits may be required. From incision to closure, the mean removal time for the implant is 4.8 minutes. Complications such as pain, edema, and bruising, may occur. Reports of infection blistering, ulcerations, sloughing, excessive scarring, phlebitis, and hyper-pigmentation have been reported. Nerve injury is commonly associated with deep placement and removal. Expulsion of one or both rods is more likely to occur when placement of the rods is extremely shallow, too close to the incision, or when the area is infected (Sivin et al., 1998). Implant movement following insertion mostly involve minor changes in position of the implants, but some
have involved significant displacement of up to several inches. After removal of the implants, levonorgestrel concentrations decrease below 100 pg/mL by 96 hours and below sensitivity of the assay by five days to two weeks. Its elimination half-life is approximately 13 to 18 hours. Levonorgestrel and its metabolites are primarily excreted in urine (40% to 68%) and a lesser amount in feces (16% to 48%) (Meirik et al., 2001).

Return to fertility amongst users is that 42% become pregnant within three months, 86% in one year, and 92% by two years (Sivin, 2001). A woman can choose to use the implant for the five years but she should be free to have it removed at any time without having to justify her request. However, good counseling and prior implant selection minimizes later rejection of the implant system (MOPHS, 2010).

2. 10 Contraceptive discontinuation

The main reasons for contraceptive discontinuation are contraceptive failure, switching, abandoning use with no further need of contraception and abandonment of use while still in need of contraception. In Kenya, about one-third, one-half, and two-thirds of women who initiate use of contraception discontinue within 12, 24 and 36 months of initiation, respectively. Discontinuation rates are high among women who use contraception for spacing purposes and it declines with both increasing age and parity of women. Although women with no formal education are less likely to adopt use, they are more likely to use for longer durations (KNBS 2010). Nationally, 30% of all discontinuations are either due to desire to have another child, reduced exposure to sex or the risk of conception. Forty-seven per-cent is due to side effects/health concerns and other method-related reasons,
18% due to method failure and 5% is due to unspecified reasons. Thus, abandonment of contraceptive use while still in need of contraception and contraceptive failure account for about 65% of all discontinuations, and about 60% of discontinuations occur during the first 36 months of use (CBS, 2010). Women who discontinue for these involuntary factors represents the potential impact that family planning programs could have on the CPR by maintaining a pool of satisfied clients and ensuring women attain their reproductive goals (APHRC, 2001).

All contraceptive methods are associated with varying levels of failure that may result from defectiveness of the method itself, user error or carelessness (MOPHS, 2010). Identification of factors that increase the risk of contraceptive failure beyond the standard method-failure rates could assist programs to reduce user-enhanced contraceptive failures. The multivariate results show that woman-level variation does not have a significant effect on the likelihood of experiencing contraceptive failure. Exposure to sexual intercourse and type of method used are the only two factors that have a significant net effect on the likelihood of contraceptive failure (APHRC, 2001).

Abandonment of contraceptive use while the woman is still in need of contraception should be as worrying as discontinuation due to method failure because the user is likely to have an unwanted or mistimed pregnancy if a new method is not adopted quickly. Older women and women at higher parities are more likely than younger and lower parity women to discontinue use while still in need. While education is a powerful covariate for many reproductive outcomes, including adoption of contraception, it does not have a
significant impact on the likelihood of experiencing contraceptive failure, switching and abandonment when not in need of contraception. The level of education only has a significant impact on the likelihood of abandoning use while still in need where non-educated and less educated women are more likely to fall in this category of discontinuation than their more educated counterparts. This shows that once a woman adopts contraception, what happens thereafter (in terms of level of protection and satisfaction) is not as dependent on socioeconomic factors as the decision to adopt contraception is (APHRC, 2001).

2.11 Five-year implant discontinuation

Globally, the first-year implant discontinuation rate is 11.7%, the three-year cumulative rate is 39.4% and the five-year cumulative rate is 58.5%. In the first year, 4.5% women cite irregular bleeding as the principal reason for discontinuing the method. The cumulative rate for discontinuation because of irregular bleeding is 14.1% through the third year and 19.3% through the fifth year. Other medical conditions are cited as reasons for stopping method use by 4.7% of users in the first year, 14.7% cumulatively by the third year, and 23.1% cumulatively by the fifth year. Headache, weight gain and acne jointly accounted for more than 50% of the medical removals. About 10% of the women stop use before the end of the third year and about 19% by the end of the fifth year because they desired to become pregnant (Sivin et al., 1998). A study in Nigeria determined that the discontinuation rate within six months of use was 3% within one year, 8.1% and within two years, 19.3%. Discontinuation due to the implants side effects was 12.2% while 9.2% discontinued due to a desire to conceive. Menstrual abnormalities
accounted for 41.7% while headache and dizziness accounted for the majority 38.1% of non-menstrual reasons for discontinuation. No pregnancy was recorded. All those who discontinued the implant within six months of use were because of side effects (Ezegwui et al., 2008).

2.12 Contraceptive switching

Switching behavior following a discontinuation focuses on whether the switch resulted in the adoption of an equally, more, or less effective method than the one discontinued. Switching to less effective methods may expose women to a greater risk of unwanted pregnancies. Patterns of switching suggest that women generally switch to methods similar to what they discontinued. Users of short-term methods tend to switch to other short term methods while users of coitus-dependent methods tend to switch to other coitus-dependent methods (MOH, 2008).

Women who discontinue while having no need for family planning should be distinguished from those who discontinue while in need. These two are substantially different and their behaviors are influenced by the same sets of factors but in opposite directions. Parity, exposure to sex, method used and socio-economic status are all important determinants of abandonment, but these have opposite effects for women who abandoned use while in need and those who did so while having no need for family planning. However, use of contraceptives for spacing purposes increases abandonment for both groups of women (APHRC, 2001).
Between 5% and 8% of all women (constituting 16% and 9% of all discontinuations at 12 and 36 months, respectively) switch contraceptive methods. Condom users exhibit the highest rates of contraceptive switching throughout the first 36 months of contraceptive use, followed by users of traditional methods, IUDs and pills. Implant users exhibit the lowest switching rates (KNBS, 2010). While a high level of method switching could be a concern from the perspective of the discontinued methods, it may also be a positive marker for the program’s capacity to provide alternative methods to users. Method characteristics, contraceptive intentions and experience affect the likelihood of contraceptive switching. Women who are using contraception for birth spacing are significantly less likely to switch to another method than women whose intention is to limit their fertility (APHRC, 2001). Switching increases with parity since women who are using contraception for spacing purposes tend to switch from short-term to mid-term methods, such as injections, before shifting to long-term or terminal methods such as the implant, IUD or sterilization (KNBS, 2010). Switching from one method to another increases the likelihood that the user will make another switch in the future as women who were using another method of contraception in the month immediately prior to the start of the episode of use (previous switchers) are more likely to switch to another method than those who were not using a method (Ferguson, 1992).
2.13 Gaps identified in literature review

To understand the five-year implant contraceptive discontinuation, there is need to understand how various factors influence its discontinuation and establish the possible associations that might exist between these factors. Establishing associations that might exist will help in formulating better family planning programs that will meet the five-year implant user reproductive goal. These programs will enhance continuation rates and ensure women discontinuing use do so without a further need of contraception. Most of the literature reviewed focus on overall contraceptive discontinuation rather than focusing on a specific contraceptive discontinuation including the five-year implant.

Also due to the relatively new nature of implant use and specifically the two rod five year implant, little research especially in Kenya has been done to ascertain its discontinuation trends. Most resources have been tailored towards enhancing its use in Kenya and less focus on its discontinuation. Thus there is a need to fill these gaps as identified in the literature reviewed.
CHAPTER 3: MATERIALS AND METHODS

3.1 Introduction

This chapter specifies the materials and methods used in the study. It gives a description of the study design, study area, sampling techniques, research tools, data collection techniques, analysis used and the ethical considerations for the study.

3.2 Research Design

A descriptive cross-sectional study was undertaken employing quantitative data. The study determined exposure to the five-year two rod implant and simultaneously determined the main factor influencing its discontinuation amongst the target population. Data was collected and analyzed between the months of April and September 2014.

3.3 Variables

3.3.1 Independent variables

i) Social-demographic factors- Age, parity, number of living children, marital status, religion, education level, residence and occupation of 5-year implant users.

ii) Five-year implant contraceptive method factors- 5-year implant failure, 5-year implant contraceptive switching, abandoning 5-year implant use while still in need of contraception and abandoning such implant use with no further need of contraception.
3.3.2 Intermediate variables

i) Community cluster variations- Contact with CBD, spousal discussion, contact with medical staff and IEC materials on implant discontinuation by 5-year implant users.

3.3.3 Dependent variable

5-year two- rod implant discontinuation.

3.4 Location of the Study

The study was conducted in Kenya’s capital city, Nairobi whose geographical co-ordinates are 1°17’S 36°49’E. It has a population of 3.1 million people of which 1.5 million are women and 1.6 million males with 30.3% of its population being below 15 years of age (CBS, 2010). It has a surface area of 695km², a population density of 4515 people per km² and a population growth rate of 7-8% (KNBS, 2010). Health care service administration in Nairobi County is through nine sub-counties namely Embakasi, Njiru, Dagoretti, Langáta, Makadara, Kasarani, Kamukunji, Starehe and Westlands (Appendix C). Family planning services are provided to the public through both public and private health facilities. Nationally, public facilities provide contraceptives to 57% of users, 42% of users are supplied through private medical sources and less than 1% through the community-based distribution system (KNBS, 2010). The Nairobi County Government currently operates eighty four health facilities in the county with all of them providing various family planning services depending on their different capabilities (MOPHS 2010).
3.5 Target Population

Nationally, 24% of all women are in the 15-49 year age group. In Nairobi, 848,051 women fall in the reproductive age group representing 26% its population (MOH, 2008). Over 60% of the population lives in the slums with the urban poor constituting 44% of Nairobi’s population (CBS, 2010). The study targeted women of the reproductive age group who discontinued using the five-year implant as their preferred method of contraception at public government health facilities.

3.6 Sampling Techniques and sample size determination

3.6.1 Sampling Techniques

Simple random sampling was used to select three sub-counties within Nairobi County. The sub-counties selected were Kamukunji, Njiru and Embakasi which have eight, five and eight public health facilities respectively. Seventeen public health centers and dispensaries in these sub-counties were then conveniently selected for the study. They were six from Kamukunji, five from Njiru and six were from Embakasi sub-counties. Three hundred and seventy seven respondents representing 98.2% of the calculated sample size attending the clinics who wanted to discontinue implant use and met the inclusion criteria were also randomly selected for the study. The sample size obtained had no effect on the outcome of the study.
Table 3.1 indicates the health facilities where the study was undertaken and how the respondents were distributed amongst these facilities.

**Table 3.1: Health facilities where the study was undertaken and number of respondents per facility**

<table>
<thead>
<tr>
<th>Embakasi sub-county - 6 health centers and dispensaries</th>
<th>Njuru sub-county - 5 health centres and dispensaries</th>
<th>Kamukunji sub-county - 6 health centers and dispensaries</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mukuru health centre -23 respondents</td>
<td>Ruai health centre -26 respondents</td>
<td>Majengo dispensary - 13 respondents</td>
</tr>
<tr>
<td>G S U health centre - 26 respondents</td>
<td>Njuru health centre - 32 respondents</td>
<td>Shauri moyo dispensary - 12 respondents</td>
</tr>
<tr>
<td>Embakasi health centre -24 respondents</td>
<td>Kariobangi south -21 respondents</td>
<td>Biafra dispensary - 17 respondents</td>
</tr>
<tr>
<td>Umoja health centre -32 respondents</td>
<td>Dandora 1 health centre -27</td>
<td>Eastleigh health centre -12 respondents</td>
</tr>
<tr>
<td>Kayole 1 health centre -25 respondents</td>
<td>Dandora 2 health centre -29</td>
<td>Muthurwa dispensary - 14 respondents</td>
</tr>
<tr>
<td>Kayole 2 health centre -29 respondents</td>
<td></td>
<td>Bahati health centre -15 respondents</td>
</tr>
</tbody>
</table>

**3.6.2 Sample Size determination**

The sample size was determined using the formula for calculating for such a population greater than 10,000 (Fisher *et al.*, 1998).

\[ n = \frac{z^2pqD}{d^2} \]

- **n** = desired sample size.
- **z** = standard normal deviate.
- **p** = proportion of the target population estimated to be discontinuing using the implant (where there is no estimate, a default of 50% is acceptable).
- **q** = 1 - **p**
\[ n = \frac{1.96^2 \times 0.5 \times 0.5}{0.05 \times 0.05} = 384 \]

The desired total sample size for the study was 384 participants.

### 3.6.3 Inclusion criteria

To be eligible for the study, the participants had to be women who chose to discontinue using the implant as their contraceptive method and were willing and able to give an informed consent (Appendix A).

The participants had to be of eighteen years of age and above to be included in the study.

### 3.6.4 Exclusion criteria

The study excluded women who did not give consent to participate in the study and those who did not meet the inclusion criteria.

### 3.7 Construction of research instruments

A pre-tested interview guide capable of capturing data on the various variables was used to collect data for the study. It was designed based on the study objectives, was standardized and constructed in a simple language which was easily understood by the research assistants and the study respondents.
3.7.1 Pre-testing

A study intending to pre-test the research instruments so that in case of any deviations, the research instrument could be adjusted accordingly was undertaken in Kasarani sub-county of Nairobi County to guarantee both the validity and reliability of the study.

3.7.2 Validity and Reliability

The construct and content validity of a study which is based on the adequacy to which the statements, questions and indicators of the research instruments measure the attributes of the study was ensured by subjecting the study instruments to critics from experts in the public health department and the ethical committee of Kenyatta University. The items were revised and improved according to advice and suggestions made. Validity was guaranteed following the pre-test while reliability was further enhanced by training and monitoring the research assistants to ensure competency and proper administration of the research instruments.

3.8 Data collection techniques and analysis

3.8.1 Data collection techniques

A standardized interview guide filled within the facility in a private session was used to collect the data (Appendix B). Data was collected with the help of two field assistants with a medical training background in the health facilities determined.
3.8.2 Data analysis

Quantitative data was collected for the study and was analyzed using the Epi info computer program. Descriptive statistics were used to summarize the sample population including percentages, frequency distribution and graphs. Chi-square and logistic regression were computed to determine if a relationship between the dependent and independent variables existed. Significance is tested at $p \leq 0.05$ level as is recommended for most descriptive research.

3.9 Logistical and Ethical Considerations

Prior to undertaking the study, relevant permission was obtained from Kenyatta University’s Graduate school (Appendix D), Kenyatta University’s Ethical Review Committee (Appendix E), Ministry of Health and Ministry of Higher Education, Science and Technology and the Nairobi County Government (Appendix F). Informed consent (Appendix A) was sought from the study participants who were assured of anonymity, confidentiality and informed of their right to withdraw from the study at any time and this was indicated by a signature or a thumb print on the form. There were no direct benefits for participating in the study.
CHAPTER 4: RESULTS

4.1 Overview

This chapter deals with the analysis and interpretation of the findings in regards to the five-year implant discontinuation by the respondents. The results are presented in a descriptive form using tables, bar charts, figures and percentages. Statistical tests and significance are given where applicable.

Respondents discontinuing the five year implant use are categorized into two main groups based on their contraceptive need after such discontinuation. The first group consists of respondents who abandon use while still in need of contraception while the second group consists of respondents who abandon implant use without further need of contraception.

4.2 Social demographic characteristics of the study respondents

4.2.1 Social demographic characteristics of the study respondents

Table 4.1 shows the social demographic characteristics of the study respondents. The five-year implant discontinuation was commonly used by women in the 20-29 year age group at 260 (68.9%) and least common in women aged forty years and above at 8 (2.1%) respondents. The mean age of the respondents was 27.26 years with a median age of 26 years. Most respondents were married were at 350 (92.8%).
One hundred and eighty seven (49.6%) respondents had a secondary education and only 4 (1.1%) had no educational background. Christians were 366 (97.1%) while 11 (2.9%) were Muslims. Sixty eight (18%) respondents were formally employed, 155 (41.1%) were self-employed and 154 (40.9%) were housewives.

Most respondents were from Embakasi sub-county at 159 (42.2%), 135 (35.8%) and 83 (22%) were from Njiru and kamukunji sub-counties respectively.
Table 4.1: Social demographic characteristics of the study the respondents

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Age group</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤19</td>
<td>10</td>
<td>2.7%</td>
</tr>
<tr>
<td>20-29</td>
<td>260</td>
<td>68.9%</td>
</tr>
<tr>
<td>30-39</td>
<td>99</td>
<td>26.3%</td>
</tr>
<tr>
<td>≥40</td>
<td>8</td>
<td>2.1%</td>
</tr>
<tr>
<td><strong>Marital status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>350</td>
<td>92.8%</td>
</tr>
<tr>
<td>Others</td>
<td>27</td>
<td>7.2%</td>
</tr>
<tr>
<td><strong>Education background</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>4</td>
<td>1.1%</td>
</tr>
<tr>
<td>Primary education</td>
<td>154</td>
<td>40.8%</td>
</tr>
<tr>
<td>Secondary education</td>
<td>187</td>
<td>49.6%</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>32</td>
<td>8.5%</td>
</tr>
<tr>
<td><strong>Religion</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>366</td>
<td>97.1%</td>
</tr>
<tr>
<td>Muslim</td>
<td>11</td>
<td>2.9%</td>
</tr>
<tr>
<td><strong>Employment status</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>68</td>
<td>18.0%</td>
</tr>
<tr>
<td>Self-employed</td>
<td>155</td>
<td>41.1%</td>
</tr>
<tr>
<td>Housewife</td>
<td>154</td>
<td>40.9%</td>
</tr>
<tr>
<td><strong>Resident sub-county</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Kamukunji</td>
<td>83</td>
<td>22.0%</td>
</tr>
<tr>
<td>Embakasi</td>
<td>159</td>
<td>42.2%</td>
</tr>
<tr>
<td>Njiru</td>
<td>135</td>
<td>35.8%</td>
</tr>
</tbody>
</table>
4.2.2 Association between social demographic characteristics of the respondents and implant discontinuation

Table 4.2 indicates that there was no significant association between the social demographic characteristics of the respondents and implant discontinuation with p-values >0.05. These social demographic characteristics included age, marital status, religion, education, occupation and the respondents’ residence.
Table 4.2: Association between the social demographic characteristics of the study respondents and five-year implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=377</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>≤ 19</td>
<td>7</td>
<td>3</td>
<td>10</td>
<td>χ²=0.83 df= 3 p value =0.73</td>
</tr>
<tr>
<td>20-29</td>
<td>197</td>
<td>63</td>
<td>260</td>
<td></td>
</tr>
<tr>
<td>30-39</td>
<td>74</td>
<td>25</td>
<td>99</td>
<td></td>
</tr>
<tr>
<td>&gt; 40</td>
<td>7</td>
<td>1</td>
<td>8</td>
<td></td>
</tr>
<tr>
<td>Marital status</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Married</td>
<td>262</td>
<td>82</td>
<td>350</td>
<td>χ²=1.14 df =1 p value =0.28</td>
</tr>
<tr>
<td>others</td>
<td>23</td>
<td>4</td>
<td>27</td>
<td></td>
</tr>
<tr>
<td>Occupation</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>53</td>
<td>15</td>
<td>68</td>
<td>χ²=0.64 df =2 p value =0.73</td>
</tr>
<tr>
<td>Self-employed</td>
<td>114</td>
<td>41</td>
<td>155</td>
<td></td>
</tr>
<tr>
<td>Housewife</td>
<td>118</td>
<td>36</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Religion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Christian</td>
<td>277</td>
<td>89</td>
<td>366</td>
<td>χ²=0.05 df =1 p value= 0.89</td>
</tr>
<tr>
<td>Muslim</td>
<td>8</td>
<td>3</td>
<td>11</td>
<td></td>
</tr>
<tr>
<td>Level of education</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>3</td>
<td>1</td>
<td>4</td>
<td>χ²=0.67 df= 3 p value =0.88</td>
</tr>
<tr>
<td>Primary education</td>
<td>119</td>
<td>35</td>
<td>154</td>
<td></td>
</tr>
<tr>
<td>Secondary education</td>
<td>138</td>
<td>49</td>
<td>187</td>
<td></td>
</tr>
<tr>
<td>Tertiary education</td>
<td>25</td>
<td>7</td>
<td>32</td>
<td></td>
</tr>
</tbody>
</table>
4.2.3 Occupation and education level of the respondents spouses

Table 4.3 shows that amongst the married couples spouses, 188 (53.7%) were self-employed, 160 (45.7%) were formally employed while only 2 (0.6%) were unemployed. All the respondents’ spouses had attained some form of education with the majority at 230 (65.7%) having a secondary education, 71 (20.3%) had a primary education and 49 (14%) had attained a tertiary education.

Table 4.3: Occupation and education level of the respondents spouses

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=350</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>If married spouse occupation</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>160</td>
<td>45.7%</td>
</tr>
<tr>
<td>Self-employed</td>
<td>188</td>
<td>53.7%</td>
</tr>
<tr>
<td>Unemployed</td>
<td>2</td>
<td>0.6%</td>
</tr>
<tr>
<td>If married spouse education</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>71</td>
<td>20.3%</td>
</tr>
<tr>
<td>Secondary education</td>
<td>230</td>
<td>65.7%</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>49</td>
<td>14.0%</td>
</tr>
</tbody>
</table>
4.2.4 Association between spousal level of education, occupation and five-year implant discontinuation

Table 4.4 shows the p-value of the respondent’s spouse occupation and his level of education were >0.05 indicating that there was no significant association between the two and five-year implant discontinuation.

Table 4.4: Association between spousal level of education, occupation and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=350</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Spouse occupation</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Employed</td>
<td>120</td>
<td>40</td>
<td>160</td>
<td>( \chi^2=0.66 )</td>
</tr>
<tr>
<td>Self-employed</td>
<td>141</td>
<td>47</td>
<td>188</td>
<td>df 2</td>
</tr>
<tr>
<td>Unemployed</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>p value =0.72</td>
</tr>
<tr>
<td><strong>Spouse level of education</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Primary education</td>
<td>52</td>
<td>19</td>
<td>71</td>
<td>( \chi^2=0.13 )</td>
</tr>
<tr>
<td>Secondary education</td>
<td>173</td>
<td>57</td>
<td>230</td>
<td>df=2</td>
</tr>
<tr>
<td>Tertiary education</td>
<td>37</td>
<td>12</td>
<td>49</td>
<td>p value =0.94</td>
</tr>
</tbody>
</table>

4.2.5 Number of living children and number of years since last delivery of the study respondents

Table 4.5 shows that one hundred and forty nine (39.5%) respondents had one child while one hundred and forty two had two children (37.7%). Three (0.8%) had no living child, 49 (13%) had three children while only 34 (9.0%) of the respondents had more than three children. The average number of children of the respondents was 1.99 with a median of 2 children.
The table also shows one hundred and nine (29%) of the respondents had delivered at least 3-4 years prior to implant discontinuation, 107 (28.3%) had delivered at least more than four years before discontinuation, 76 (20.2) had last delivered two to three years before discontinuation and 85 (22.5%) less than two years before removal. The average number of years since the respondents’ had last delivered was 3.67 years. Those who abandoned use while still in need of contraception had last delivered at an average of 3.5 years before discontinuing while those who abandoned use with no further need of contraception had last delivered on average 4.7 years before discontinuing.

**Table 4.5: Number of children and number of years since last delivery by the respondents**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency (n)=377</th>
<th>Percentage</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>No. of living children</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>3</td>
<td>0.8%</td>
</tr>
<tr>
<td>1</td>
<td>149</td>
<td>39.5%</td>
</tr>
<tr>
<td>2</td>
<td>142</td>
<td>37.7%</td>
</tr>
<tr>
<td>3</td>
<td>49</td>
<td>13.0%</td>
</tr>
<tr>
<td>&gt;3</td>
<td>34</td>
<td>9.0%</td>
</tr>
<tr>
<td><strong>No. of years since last delivery</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;2</td>
<td>85</td>
<td>22.5%</td>
</tr>
<tr>
<td>2-3</td>
<td>76</td>
<td>20.2%</td>
</tr>
<tr>
<td>3-4</td>
<td>109</td>
<td>29.0%</td>
</tr>
<tr>
<td>&gt;4</td>
<td>107</td>
<td>28.3%</td>
</tr>
</tbody>
</table>
Table 4.6: Association between number of living children, number of years since a woman’s last delivery and implant discontinuation

Table 4.6 indicates there was a significant association between number of living children with a p-value of 0.00009 (p-value<0.05) and number of years since the respondent had last delivered with a p-value of 0.0001 (p-value <0.05) and implant discontinuation. This suggests that respondents with a higher number of living children discontinued implant use while still requiring continued contraceptive use while those with a lower number discontinued use without requiring further contraception. Also, respondents with more years since they had last delivered discontinued implant use with no further need of contraception while those who had recently delivered required further contraception.

Table 4.6: Association between number of living children, number of years since a woman’s last delivery and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=377</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Number of living children</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>0</td>
<td>2</td>
<td>1</td>
<td>3</td>
<td>(\chi^2=18.63)</td>
</tr>
<tr>
<td>1</td>
<td>96</td>
<td>53</td>
<td>149</td>
<td>df= 4</td>
</tr>
<tr>
<td>2</td>
<td>115</td>
<td>27</td>
<td>142</td>
<td>p value =0.00009</td>
</tr>
<tr>
<td>3</td>
<td>44</td>
<td>5</td>
<td>49</td>
<td></td>
</tr>
<tr>
<td>&gt; 3</td>
<td>28</td>
<td>6</td>
<td>34</td>
<td></td>
</tr>
<tr>
<td><strong>Number of years since last delivery</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 2</td>
<td>80</td>
<td>5</td>
<td>85</td>
<td>(\chi^2=21.14)</td>
</tr>
<tr>
<td>2</td>
<td>56</td>
<td>20</td>
<td>76</td>
<td>df =3</td>
</tr>
<tr>
<td>3-4</td>
<td>76</td>
<td>33</td>
<td>109</td>
<td>p value =0.0001</td>
</tr>
<tr>
<td>&gt; 4</td>
<td>73</td>
<td>34</td>
<td>107</td>
<td></td>
</tr>
</tbody>
</table>
4.3 Health facilities used by the respondents for current implant inserted

Table 4.7 shows three hundred and fifteen respondents (83.5%) who were discontinuing the five-year implant use had the implant inserted at a public facility and a further 256 (67.9%) were counseled before the implant was inserted. More respondents were counselled at private facilities compared to the public facilities.

Table 4.7: Health facility used by the respondents for current implant inserted

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Facility of implant insertion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>315</td>
<td>83.5%</td>
</tr>
<tr>
<td>Private</td>
<td>62</td>
<td>16.5%</td>
</tr>
<tr>
<td>Counseling before insertion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>256</td>
<td>67.9%</td>
</tr>
<tr>
<td>No</td>
<td>121</td>
<td>32.1%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Counselling in public facilities</th>
<th>Frequency=315</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>212</td>
<td>67.3%</td>
</tr>
<tr>
<td>No</td>
<td>103</td>
<td>32.7%</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Counselling in private facilities</th>
<th>Frequency=62</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Yes</td>
<td>44</td>
<td>71.0%</td>
</tr>
<tr>
<td>No</td>
<td>18</td>
<td>29.0%</td>
</tr>
</tbody>
</table>
4.4 Association between health facility of implant insertion and implant discontinuation

Table 4.8 indicates that neither the facility of implant insertion nor counseling had any significant association with implant discontinuation with p-values >0.05.

Table 4.8: Association between health facility of implant insertion, counseling and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=377</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health facility type</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Public</td>
<td>239</td>
<td>76</td>
<td>315</td>
<td>$\chi^2=0.08$</td>
</tr>
<tr>
<td>Private</td>
<td>46</td>
<td>16</td>
<td>62</td>
<td>df =1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p value = 0.78</td>
</tr>
<tr>
<td>Counseling</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>192</td>
<td>64</td>
<td>256</td>
<td>$\chi^2=0.15$</td>
</tr>
<tr>
<td>No</td>
<td>93</td>
<td>28</td>
<td>121</td>
<td>df =1</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>p value 0.7</td>
</tr>
</tbody>
</table>
4.5 Categories of study respondents discontinuing five year implant use

Respondents discontinuing the five year implant use are categorized into two main groups based on their contraceptive need after such discontinuation. The first group consists of respondents who abandon use while still in need of contraception while the second group consists of respondents who abandon implant use without further need of contraception. Table 4.9 shows two hundred and eighty one (74.5%) of the respondents discontinued implant use while still in need of contraception while 96 (25.5%) of the respondents did not require further contraception after discontinuation of the five-year implant.

Table 4.9: Categories of study respondents discontinuing five year implant use

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Categories of respondents discontinuing implant use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abandoning use while still in need of contraception</td>
<td>281</td>
<td>74.5%</td>
</tr>
<tr>
<td>Abandoning use with no further need of contraception</td>
<td>96</td>
<td>25.5%</td>
</tr>
</tbody>
</table>

4.6 Reasons for five year implant discontinuation amongst the study respondents

Table 4.10 indicates that menstrual changes were the main reasons for implant discontinuation for respondents requiring further contraception with 125 (44.5%) respondents. Other medical conditions accounted for 103 (36.7%) of the discontinuing respondents, incision site factors accounted for 13 (4.6%) discontinuing respondents, 5
(2.1%) wished to change their contraceptive method while 4 (1.4%) respondents discontinued due to spousal disapproval. Only 29 (10.3%) respondents had used the implant up to its expiry period of five-years.

Table 4.10 further shows most clients who abandoned the five-year implant use with no further need of contraception did so in order to conceive at 86 (89.7%), 7 (7.3%) discontinued due to lack of a spouse, 1 (1%) due to method failure, 1 (1%) was inserted the five-year implant while pregnant and 1 (1%) had become menopausal.

**Table 4.10: Reasons for implant discontinuation amongst respondents**

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Abandoning use while still in need of contraception-reasons</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Abandoning use while still in need of contraception-reasons</td>
<td>281</td>
<td>100%</td>
</tr>
<tr>
<td>Menstrual changes</td>
<td>125</td>
<td>44.5%</td>
</tr>
<tr>
<td>Medical conditions</td>
<td>103</td>
<td>36.7%</td>
</tr>
<tr>
<td>Expiry</td>
<td>29</td>
<td>10.3%</td>
</tr>
<tr>
<td>Incision site factors</td>
<td>13</td>
<td>4.6%</td>
</tr>
<tr>
<td>Change of method</td>
<td>5</td>
<td>2.1%</td>
</tr>
<tr>
<td>Spousal disapproval</td>
<td>4</td>
<td>1.4%</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>0.7%</td>
</tr>
<tr>
<td><strong>Abandoning use with no further need of contraception-reasons</strong></td>
<td>96</td>
<td>100%</td>
</tr>
<tr>
<td>Conceive</td>
<td>86</td>
<td>89.7%</td>
</tr>
<tr>
<td>Lack of a spouse</td>
<td>7</td>
<td>7.3%</td>
</tr>
<tr>
<td>Menopausal</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Method failure</td>
<td>1</td>
<td>1.0%</td>
</tr>
<tr>
<td>Insertion while pregnant</td>
<td>1</td>
<td>1.0%</td>
</tr>
</tbody>
</table>
4.6.1 Menstrual conditions influencing discontinuation of the implant contraceptive

Menstrual changes were the leading cause of all discontinuations for respondents who discontinued implant use while still in need of continued contraception at 125 (44.5%) (Table 4.10). Figure 4.1 illustrates that the main menstrual cycle changes were prolonged menstrual bleeding and menorrhagia accounting for 90 (72.4%) respondents, spotting accounted for 18 (15%) respondents, amenorrhea accounted for 5 (4.7%) respondents and irregular bleeding accounted for 12 respondents.

**Figure 4.1: Menstrual factors influencing discontinuation of the implant contraceptive**
4.6.2 Incision site factors influencing discontinuation of the implant contraceptive

Incision site factors accounted for 4.6% of all those who discontinued but still required further contraception (Table 4.10). Figure 4.2 illustrates that pain at the incision site was the commonest cause of implant discontinuation with 8 (61.5%) respondents. Incision site infection and improper insertion accounted for 4 (30.8%) and 1 (7.7%) of all discontinuations due to incision site factors respectively.

Figure 4.2: Incision site factors influencing discontinuation of the implant contraceptive
4.6.3 Other medical factors influencing discontinuation of the implant contraceptive

Medical causes accounted for 103 (36.7%) respondents who abandoned used while still requiring contraception (Table 4.10). Figure 4.3 illustrates weight changes were the commonest cause of medical discontinuations with weight loss having 21 (20.0%) respondents and weight gain having 15 (14.29%) respondents. Headache and backache were the other common reasons for medical causes of implant discontinuation at 19 (18.10%) and 16 (15.24%) respondents respectively. Dizziness had 14 (13.32%) respondents, 5 (4.76%) discontinuations were due to increased blood pressure and those due to decreased libido were 4 (3.81%).

Figure 4.3: Other medical factors influencing discontinuation of the implant contraceptive
4.7 Community cluster variations influencing implant discontinuation

4.7.1 IEC materials, contact with CBD, medical staff discussion and implant discontinuation

Table 4.11 indicates that thirty nine (10.3%) respondents had referred to IEC materials prior to their decision to discontinue using the implant, 139 (36.9%) had discussed with medical staff prior to the discontinuation and 80 (21.2%) had discussed with the community based distributors.

Table 4.11: Community cluster variations influencing implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IEC materials</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>39</td>
<td>10.3%</td>
</tr>
<tr>
<td>No</td>
<td>338</td>
<td>89.7%</td>
</tr>
<tr>
<td><strong>Contact with CBD/CHW</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>80</td>
<td>21.2%</td>
</tr>
<tr>
<td>No</td>
<td>297</td>
<td>78.8%</td>
</tr>
<tr>
<td><strong>Contact with medical staff</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>139</td>
<td>36.9%</td>
</tr>
<tr>
<td>No</td>
<td>238</td>
<td>63.1%</td>
</tr>
</tbody>
</table>
4.7. Association between IEC materials, contact with CBD, medical staff discussion and implant discontinuation

Table 4.12 shows that use of IEC materials, contact with CBD and medical staff discussion had no significant association with implant discontinuation since their p-value >0.05.

Table 4.12: Association between community cluster variations and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total N=377</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>IEC material</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>32</td>
<td>7</td>
<td>39</td>
<td>$\chi^2=0.98$</td>
</tr>
<tr>
<td>No</td>
<td>253</td>
<td>85</td>
<td>338</td>
<td>df =1 p value 0.08</td>
</tr>
<tr>
<td><strong>Contact with CBD</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>57</td>
<td>23</td>
<td>80</td>
<td>$\chi^2=1.04$</td>
</tr>
<tr>
<td>No</td>
<td>228</td>
<td>69</td>
<td>297</td>
<td>df= 1 p value 0.31</td>
</tr>
<tr>
<td><strong>Medical staff discussion</strong></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>112</td>
<td>27</td>
<td>139</td>
<td>$\chi^2=2.95$</td>
</tr>
<tr>
<td>No</td>
<td>173</td>
<td>65</td>
<td>238</td>
<td>df= 1 p value =0.08</td>
</tr>
</tbody>
</table>
4.7.3 Spousal discussion prior to implant discontinuation

Table 4.13 indicates that a majority of the respondents at 227 (64.8%) had discussed with their spouses of their intention to discontinue using the contraceptive.

Table 4.13: Spousal discussion prior to implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=350</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spousal discussion</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>227</td>
<td>64.8%</td>
</tr>
<tr>
<td>No</td>
<td>123</td>
<td>35.2%</td>
</tr>
</tbody>
</table>

4.7.4 Association between spousal discussion and implant discontinuation

Table 4.14 shows that spousal discussion had a significant association with the five-year implant discontinuation with a p-value of 0.00039 (p-value <0.05). This indicates that those who had discussed with their spouses discontinued implant use without requiring continued contraception while those who did not discuss with their spouses required further contraceptive use after the implant discontinuation.

Table 4.14: Association between spousal discussion and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=350</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Spousal discussion</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Yes</td>
<td>159</td>
<td>68</td>
<td>227</td>
<td></td>
</tr>
<tr>
<td>No</td>
<td>107</td>
<td>16</td>
<td>123</td>
<td></td>
</tr>
</tbody>
</table>

\( \chi^2 = 12.56 \)

\( df = 1 \)

\( p \text{ value} = 0.00039 \)
4.8 Average duration of implant use by the respondents

Table 4.15 indicates the average duration of implant use by the respondents. Discontinuation at less than 12 months of use was by 169 (44.8%) respondents, 166 (44.1%) had used it for a period of between 12 and 36 months and only 42 (11.1%) had used it for more than 36 months.

The overall average duration of implant use was 19.30 months with those abandoning while still in need of contraception averaging 18.17 months while those who did not require further contraception averaging 22.61 months. Respondents who abandoned use in order to conceive used the implant for an average of 23 months, those who discontinued due to lack of a spouse or had become menopausal had used it for an average of 17 months and those who discontinued as a result of method failure used it for 14 months. One respondent had the implant inserted while she was pregnant and had used the implant for three months.

Those who discontinued the implant due to menstrual changes used it for 13.73 months on average, those due to incision site factors used it on average 11.38 months and those due to other medical conditions used it for an average of 13.65 months. Respondents discontinuing use due to spousal disapproval had used it for an average of 15.5 months while those who wished to change their contraceptive method had used it for an average of 28.5 months.
Table 4.15: Average duration of implant use for abandoning use while still in need or not in need of further contraception

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of implant use in months</td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt;12</td>
<td>169</td>
<td>44.8%</td>
</tr>
<tr>
<td>12-36</td>
<td>166</td>
<td>44.1%</td>
</tr>
<tr>
<td>&gt;36</td>
<td>42</td>
<td>11.1%</td>
</tr>
<tr>
<td>Abandoning use while still in need of contraception</td>
<td>Frequency(n)=377</td>
<td>Average duration of use in months</td>
</tr>
<tr>
<td>- reasons</td>
<td>281</td>
<td>18.17</td>
</tr>
<tr>
<td>Menstrual changes</td>
<td>125</td>
<td>13.73</td>
</tr>
<tr>
<td>Medical conditions</td>
<td>103</td>
<td>13.64</td>
</tr>
<tr>
<td>Expiry</td>
<td>29</td>
<td>60.00</td>
</tr>
<tr>
<td>Incision site factors</td>
<td>13</td>
<td>11.38</td>
</tr>
<tr>
<td>Spousal disapproval</td>
<td>4</td>
<td>15.50</td>
</tr>
<tr>
<td>Change of method</td>
<td>5</td>
<td>28.50</td>
</tr>
<tr>
<td>Others</td>
<td>2</td>
<td>24.50</td>
</tr>
<tr>
<td>Abandoning use with no further need of contraception</td>
<td>Frequency(n)=377</td>
<td>Average duration of use in months</td>
</tr>
<tr>
<td>- reasons</td>
<td>96</td>
<td>22.61</td>
</tr>
<tr>
<td>Conceive</td>
<td>86</td>
<td>23.00</td>
</tr>
<tr>
<td>Lack of a spouse</td>
<td>7</td>
<td>17.00</td>
</tr>
<tr>
<td>Menopausal</td>
<td>1</td>
<td>17.00</td>
</tr>
<tr>
<td>Insertion while pregnant</td>
<td>1</td>
<td>3.00</td>
</tr>
<tr>
<td>Method failure</td>
<td>1</td>
<td>14.00</td>
</tr>
<tr>
<td>Overall</td>
<td>377</td>
<td>19.30</td>
</tr>
</tbody>
</table>
4.9 Association between implant use duration and implant discontinuation

Table 4.16 shows the number of months that the implant had been in use was significant with a p-value of 0.01 (p-value <0.05) indicating that those who had used the implant for longer durations abandoned use without requiring further contraception while those who used it for a shorter duration of time required continued contraception.

Table 4.16: Association between implant use duration of implant use and implant discontinuation

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=350</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Duration of implant use in months</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>&lt; 12 months</td>
<td>140</td>
<td>29</td>
<td>169</td>
<td>χ²=8.97</td>
</tr>
<tr>
<td>12-36 months</td>
<td>115</td>
<td>51</td>
<td>166</td>
<td>df= 2</td>
</tr>
<tr>
<td>&gt; 36 months</td>
<td>30</td>
<td>12</td>
<td>42</td>
<td>p=0.01</td>
</tr>
</tbody>
</table>
4.10 Prior contraceptive used by respondents discontinuing implant use in Nairobi County

Table 4.17 indicates prior to implant insertion 257 (68.1%) respondents were using short-term contraception with 164 (43.5%) using injectable contraceptives and 88 (23.3%) using the pill. Condoms had previously been used by 5 (1.3%) respondents. Only 12 (3.2%) had been on a long term contraceptive with 10 (2.7%) using the implant and 2 (0.5%) using the IUCD. The calendar method was the only previously used traditional method with 2 (0.5%) respondents.

Table 4.17: Prior contraceptive used by respondents discontinuing implant use in Nairobi County

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Prior contraceptive use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>106</td>
<td>28.2%</td>
</tr>
<tr>
<td><strong>Short- term contraception</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injectable</td>
<td>164</td>
<td>43.5%</td>
</tr>
<tr>
<td>Pills</td>
<td>88</td>
<td>23.3%</td>
</tr>
<tr>
<td>Condom</td>
<td>5</td>
<td>1.3%</td>
</tr>
<tr>
<td><strong>Long term contraception</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Implants</td>
<td>12</td>
<td>3.2%</td>
</tr>
<tr>
<td>IUCD</td>
<td>2</td>
<td>0.5%</td>
</tr>
<tr>
<td><strong>Traditional methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calendar</td>
<td>2</td>
<td>0.5%</td>
</tr>
</tbody>
</table>
4.11 Association between prior contraceptive used by respondents discontinuing implant use in Nairobi County and five-year implant discontinuation

Table 4.18 shows that the prior contraceptive method used by the respondent whose p-value was >0.05 had no significant association with implant discontinuation.

Table 4.18: Association between prior contraceptive used by respondents discontinuing implant use in Nairobi County and five-year implant discontinuation

<table>
<thead>
<tr>
<th>characteristic</th>
<th>Abandoning use while still in need</th>
<th>Abandoning use with no further need</th>
<th>Total n=377</th>
<th>Significance level</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior contraceptive</td>
<td>1</td>
<td>1</td>
<td>2</td>
<td>$\chi^2=5.14$</td>
</tr>
<tr>
<td>Calendar</td>
<td>4</td>
<td>5</td>
<td>9</td>
<td>df =6</td>
</tr>
<tr>
<td>Condom</td>
<td>1</td>
<td>0</td>
<td>2</td>
<td>p value= 0.53</td>
</tr>
<tr>
<td>Implant</td>
<td>5</td>
<td>10</td>
<td>15</td>
<td></td>
</tr>
<tr>
<td>Injectables</td>
<td>125</td>
<td>39</td>
<td>164</td>
<td></td>
</tr>
<tr>
<td>IUCD</td>
<td>2</td>
<td>2</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>79</td>
<td>27</td>
<td>106</td>
<td></td>
</tr>
<tr>
<td>Pills</td>
<td>68</td>
<td>20</td>
<td>88</td>
<td></td>
</tr>
</tbody>
</table>


4.12 Subsequent contraceptive desired by women discontinuing implant use

Table 4.19 shows that after implant removal, 185 (49.1%) respondents desired to revert back to short-term methods with 97 (25.7%) still preferring injectable contraceptives, 85 (22.6%) preferred to use the pill and only 3 (0.8%) would prefer the condom.

Long-term or permanent contraceptives would be preferred by 50 (13.2%) respondents after the implant discontinuation. Subsequently IUCD preference tremendously increased with 25 (6.6%) respondents after been previously used by 2 (0.5%) respondents, 20 (5.3%) had the implant reinserted, 5 (1.3%) would have preferred the permanent contraception method while 17 (4.5%) were undecided on what they would subsequently use as contraception following the discontinuation.

Table 4.19: Subsequent contraceptive desired by women discontinuing implant use

<table>
<thead>
<tr>
<th>Characteristic</th>
<th>Frequency(n)=377</th>
<th>Proportion (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Subsequent contraceptive use</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>None</td>
<td>124</td>
<td>32.9%</td>
</tr>
<tr>
<td><strong>Short term contraception</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Injectable</td>
<td>185</td>
<td>49.1%</td>
</tr>
<tr>
<td>Pills</td>
<td>97</td>
<td>25.7%</td>
</tr>
<tr>
<td>Condom</td>
<td>85</td>
<td>22.6%</td>
</tr>
<tr>
<td><strong>Long term and permanent contraception</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>IUCD</td>
<td>50</td>
<td>13.2%</td>
</tr>
<tr>
<td>Implant</td>
<td>25</td>
<td>6.6%</td>
</tr>
<tr>
<td>Female sterilization</td>
<td>20</td>
<td>5.3%</td>
</tr>
<tr>
<td><strong>Traditional methods</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Calendar</td>
<td>1</td>
<td>0.3%</td>
</tr>
<tr>
<td>Undecided</td>
<td>17</td>
<td>4.5%</td>
</tr>
</tbody>
</table>
4.13 Logistic regression for the predictors of five-year implant discontinuation

The variables which were significantly associated with the five-year implant discontinuation in the bivariate analysis were further analyzed using logistic regression. The odds ratio illustrated to what extent the independent variables influenced the discontinuation of the five-year implant amongst women of the reproductive age group in Nairobi County. The p-value indicated the significance of association between the independent variable and the dependent variable.

The strongest predictors of the five-year implant discontinuation were spousal discussion and number of living. Table 4.20 shows that spousal discussion was significantly associated with the reason for implant discontinuation with a p-value of 0.0002, a negative coefficient of 0.0972 and odd ratio of 0.3345. This implies that women who had discussed with their spouses were 0.3345 less likely to abandon implant use while still requiring further contraception. Thus, when they abandoned implant use, they did so without requiring further contraception mostly to conceive. Table 4.20 further shows the number of living children a woman had was also significantly associated with the five year implant discontinuation with a p-value of 0.0018, a positive coefficient of 0.4671 and an odds ratio of 1.5943. The odds ratio implies that women with more children were 1.5943 more likely to abandon implant use while still in need of contraception.

However, the duration of implant use and the number of years since a woman’s last delivery were not significantly associated with implant discontinuation in the logistic regression with a p values >0.05.
Table 4.20: Logistic regression of predictors of five-year implant discontinuation

| Variable                          | Odds Ratio | 95% Confidence interval | Coefficient | Standard Error | z     | P>|z| |
|-----------------------------------|------------|--------------------------|-------------|----------------|-------|-----|
| Spousal discussion                | 0.3345     | 0.1873-0.5973            | -1.0952     | 0.2958         | -3.7020 | 0.0002 |
| Number of years since last delivery | 0.9610     | 0.8820-1.0472            | -0.0397     | 0.0438         | -0.9071 | 0.3643 |
| Duration of implant use in months | 0.9838     | 0.9676-1.003             | -0.0163     | 0.0085         | -1.9234 | 0.0544 |
| Number of living children         | 1.5953     | 0.1903-2.1381            | 0.4671      | 0.1494         | 3.1259 | 0.0018 |
| Constant                          |            |                          | 1.492       | 0.3931         | 3.7954 | 0.0001 |
CHAPTER 5: DISCUSSION, CONCLUSIONS AND RECOMMENDATIONS

5.1 Overview
This chapter discusses the findings of the study in comparison with other studies and makes suggestions on what can be done to improve the five-year implant family planning program. It also gives a summary of the findings, conclusion and operational recommendations for the study.

5.2 DISCUSSION
5.2.1 Social demographic characteristics of the respondents and implant discontinuation
5.2.1.1 Age and reasons for implant discontinuation
According to the KNBS, (2015) implant use is more common in women below 29 years of age. Similarly a majority of the women in the study were in this age-group which could be attributed to the fact that younger women had yet to achieve their ideal family size compared to that of the older age group since the ideal family size according to the KDHS (2014) is 2.7 children per woman in Nairobi and 3.9 nationally while in the study women below 30 years averaged 1.69 living children and those with over 30 years averaged 2.75 living children.

Women over 30 years had used the implant for a longer duration of time at 25.6 months and had last delivered five years prior to discontinuation while younger women averaged
16.8 months of use and 3.1 years since they had last had their delivery. More women over 30 years were on a contraceptive prior to using the implant. The injectables were the predominant method of contraception in all age-groups. KNBS (2015) reports that the contraceptive prevalence is higher among married women over 30 years and from the study, this age group also has low discontinuation rates. However, there were no major differences between implant discontinuation and the various age groups with a p-value of 0.73 (Table 4.2) and menstrual changes were the commonest causes of implant discontinuation amongst all age groups.

**5.2.1.2 Education level and implant discontinuation**

From the study, there was no marked variation between the respondents’ education level and implant discontinuation with a p-value of 0.88 (Table 4.2). The majority at 49.6% had completed their secondary education which is consistent with the national educational statistics in which 37% of the women have finished their secondary education (KNBS, 2010). The spouses’ level of education also did not influence implant discontinuation with a p-value of 0.94 (Table 4.4). This indicates that the implants effects on the body for those who abandoned while in need of contraception and conception for those who abandoned while not in need rather than the level of education of either respondent or their spouse determined implant discontinuation. Thus, while education is a powerful covariate for many reproductive outcomes, including adoption of contraception, it does not have a significant impact on the likelihood of experiencing implant contraceptive failure, switching and abandonment when not in need of contraception (APRC, 2001).
5.2.1.3 Number of living children and implant discontinuation

There was a significant association between the number of living children and implant discontinuation with a p-value of 0.00009 (p-value<0.05) (Table 4.6) on bivariate analysis and a p-value of 0.0018 on logistic regression (Table 4.20). Women with a few number of children abandoned use with no need of further contraception while those with more children abandoned implant use while still requiring continued contraception. Comparably, women who had one or two children abandoned implant use in order to conceive while those with three or more children abandoned use due to the methods side effects. Women who abandoned use but still required continued contraception had an average of 2.12 children as opposed to those who abandoned use without any further need of contraception at 1.61 children.

This indicates that fertility preferences are closely related to the number of living children a woman has. In general, as the number of living children increases, the desire to have another child decreases and thus contraceptive discontinuation and vice versa. 73% of currently married women with no living child would like to have a child soon, while 65% of those with one child would prefer to have a second child after some delay (KNBS, 2015). Interest in controlling the number of births grows rapidly as the number of children increases; for instance, more than half of currently married women with three or more children want no more children or are sterilized, but only 3% of women with no children want no more (KNBS, 2015). The study thus indicates that there is a very strong desire by women in Nairobi to control the number of living children they have.
5.2.1.4 Number of years since last delivery and implant discontinuation

There was a significant association between the number of years since a woman’s last delivery and reason for implant discontinuation with a p-value of 0.0001 (p-value <0.05) (Table 4.6). This implies that women who had last delivered more years before implant removal abandoned use without further need of contraception while those who had last delivered recently prior to implant removal discontinued use while still requiring further contraception. However it was not a strong predictor of implant discontinuation in the logistic regression with a p-value of 0.3643 (Table 4.20).

The average number of years since the respondents had last delivered was 3.67 years which is higher than the national median of 2.75 years (KNBS, 2010). Those who abandoned use while still in need of contraception had last delivered an average of 3.5 years before while those who abandoned use with no further need of contraception had last delivered on average 4.7 years before. This suggests that those with less than three years since their last delivery abandoned implant use while still in need of contraceptives mainly due to the implants side effects while those whose number of years since their last delivery was more than three years abandoned use without further need of contraception, a majority in order to conceive.

The length of intervals between births contributes greatly to the level of fertility and also affects the health of both the mother and the child. Children born fewer than 24 months after a previous sibling are at greater risk of having poor health and that such births threaten maternal health (KNBS, 2015). There is a considerable desire among Kenyan
women to control the timing and number of births. Among currently married women, 32% would like to delay their next birth for two years or more, and 47% do not want to have any more children. About 13% of married women would like to have a child soon (within two years), 3% of women are completely undecided, while 1% of women want to have another child but are undecided as to when (KNBS, 2015).

This indicates there is a widespread desire amongst women of Nairobi to control the spacing of births they have and possibly are aware of risks associated with short spacing durations to both the mother and child. It further indicates successful implementation of family planning programs for spacing purposes within the county.

5.2.1.5 Health facilities of implant insertion and implant discontinuation

Majority of the respondents at 83.6% had the implant inserted at a public facility and a further 67.9% were counseled before the implant was inserted (Table 4.7). These figures are higher than the national figures in which 77% of implant users obtain contraceptives from public facilities and 61% of users of modern contraceptive methods receive some form of counseling (KNBS, 2010). This can be attributed to the free/low cost services offered in government health facilities (KDHS 2010). There were no major variations for implant discontinuation between those who had received the service from a private or public facility with a p-value of 0.78 (Table 4.8). The respondents who had the implant inserted at a private facility however used the method for a longer duration than those who obtained from a public facility probably due to the higher initial cost of obtaining the contraceptive.
Counseling is crucial to screen and inform potential users about the mechanism of action of the contraceptive, possible side-effects and to reassure them about the method, especially with respect to side-effects (Sivin et al., 2001). Good counseling before implant insertion is very important and can increase the continuation rate. The results indicate that although those who received prior counseling used the method for longer at 20 months than those received did not receive any counseling at 17.8 months. However, counseling did not influence the respondents implant discontinuation with a p-value of 0.7 (Table 4.8). This could possibly indicate low tolerance of side effects especially bleeding disturbances induced by implantable progestogen-only contraceptives in the Kenyan cultures, inadequate counselling or poor counselling techniques.

5.2.3 Community cluster variations and implant discontinuation

Use of family planning methods is facilitated when couples discuss and agree on the issue. A majority of currently married women report that their husbands/ partners knew they were using a method of family planning (KNBS, 2010). Similarly the study indicates more than two thirds of the participants discontinuing implant use had discussed with their spouses of their intention to discontinue. Spousal discussion had a significant influence on implant discontinuation with a p-value of 0.00039 (p-value <0.05) (Table 4.14) on bivariate analysis and a p-value of 0.0002 on logistic regression (Table 4.20). Respondents who had discussed with their spouses were more likely to abandon implant use without further need of contraception while those who had not had such a discussion discontinued use while still requiring further contraception. The average number of living children for those who had discussed with their husbands was 1.88 which was lower than
those who had not discussed at 2.21. For those who discussed discontinuation and required no further contraception, majority did so in order to conceive indicating that spousal approval is important before conception. Alaii et al. (2012) established that reasons for engaging spouses include: mutual respect for relationship, joint responsibility for current and future children and fears about potential undesirable consequences of FP use. Male partners, by virtue of their decision-making power and control of financial resources, play a crucial role in the uptake and successful continuation of family planning methods. This underscores the critical need to program male involvement both in uptake and in advocacy of contraceptive use.

Access to information is essential for increasing people’s knowledge and awareness of what is taking place around them which may eventually affect their perceptions and behavior (KDHS, 2010). The Division of Reproductive Health in the Ministry of Health together with various stakeholders uses the media to inform the population about family planning issues. Information on the level of public exposure to a particular type of media allows policymakers to assess the most effective media for the various target groups in the population. Majority of women hear family planning messages through the radio followed by television and print media (KDHS, 2010). However, from this study IEC materials were least utilized in arriving at a decision to discontinue implant use and there was no significant association between IEC material use and implant discontinuation with a p-value of 0.08 (Table 4.12). This indicates that they were not influenced by the media in their decision making process or the media did not provide adequate information on implant continuation/discontinuation.
Most women did not involve the medical staff or the community health workers in arriving at the decision to discontinue implant use possibly due medical staff/CBD disapproval of early implant discontinuation. Also, there was no significant association between medical staff or CBD contact with p-values of 0.08 and 0.31 respectively (Table 4.12) and implant discontinuation. Debra et al. (1996) cautions family planning providers against attempting to influence women to choose a specific method since women who perceive such influences are more likely to discontinue the contraceptive use in the first six months of use. Thus, even when providers "succeed" in influencing a woman's choice of method, the "success" can be short-lived, as it may place the woman at a higher risk of early discontinuation. The best counselling approach entails the provision of information that enables women to fully evaluate the strengths and weaknesses of their contraceptive options, so that they can ultimately make free and informed contraceptive choices.

5.2.4 Duration of implants use and implant discontinuation

There was a significant association between the duration of implant use and implant discontinuation with a p-value of 0.01 (p-value <0.05) (Table 4.16). The average duration of implant use was 19.30 months. Those who abandoned use while still requiring contraception used it for a lesser duration of time (18.17 months) than those who abandoned use with no further need of contraception (22.61 months) (Table 4.15). However, the duration of implant use was not a strong predictor of implant discontinuation according to the logistic regression with a p-value of 0.0544 (Table 4.20). A majority of women who used the method past 36 months used it to its expiry. Over 70% of the discontinuations at less than 12 months were due side effects, either menstrual changes, incision site factors or other medical conditions. A majority of women who
wanted to conceive had used the method for a period longer than 12 months and thus abandoned use with no further need of contraception.

Thirty two per-cent of the respondents discontinued implant use within one year, 83.3% within three years and only 8.5% had used it to its expiry. The one year discontinuation rate is similar to the national trends of contraceptive discontinuation which is 33.3% but higher by the third year which is at 66.7% according to APRC (2001). The discontinuations due to side effects at 64% are higher than those reported for all contraceptive methods which according to APRC (2001), overall contraceptive discontinuation due to side effects/health concerns and other method-related reasons are 47%. This indicates there is a very low tolerance of the implants side effects by the users.

5.2.4.1 Menstrual changes and implant discontinuation

The study determined that menstrual changes were the commonest reason for implant discontinuation for those respondents who required continued contraception accounting for over 40% and a contributor to early implant discontinuation with an average use of 13.73 months compared to an overall average of 19.30 months (Table 4.15). Prolonged menstrual bleeding, menorrhagia and spotting were the leading menstrual causes of implant discontinuation. These findings are similar to a research by Sivin et al., (2002), which established that menorrhagia and prolonged bleeding were the leading cause of implant removal in the first year and throughout the five years of implant use at 25.9% but amenorrhea was the second commonest cause accounting for 13.9% of all menstrual causes for implant discontinuation throughout the five years of implant.
Disruption of the menstrual cycle is the method’s predominant side effect since the implant contains no estrogen. Most women can expect some variation in their menstrual bleeding patterns such as irregular menstrual bleeding, prolonged episodes of bleeding, menorrhagia, spotting between periods, no bleeding at all for several months or a combination of these patterns (Sivin et al., 1997). The kind of menstrual change a woman will have with the implant is unpredictable. These changes may occur at any time but are most common during the first year of use and then decline steadily over the following years. Thus, a capability of managing these menstrual side effects is often the difference between satisfaction and discontinuation (Biswa et al., 1996).

Therefore, women considering implant use should be informed that they are likely to experience changes in their menstrual pattern and that these changes are not a sign of ill health. Women who continue to find the spotting or bleeding troublesome even after reassurance may benefit from a number of medication interventions. However irregular bleeding may recur after discontinuation of a course of any of these medications (Debra et al., 1996).

5.2.4.2 Incision site factors and implant discontinuation

Incision site factors are also a contributor of early implant discontinuation at 11.38 months compared to the overall average duration of 19.30 months (Table 4.15). The rods are inserted just below the skin of the woman’s inner upper arm through a small incision made either with a scalpel or a disposable pre-loaded inserter (Sivin et al., 2002).
Complications such as pain, edema, bruising, reports of infection blistering, ulcerations, sloughing, excessive scarring, phlebitis, and hyper-pigmentation may occur. Nerve injury is commonly associated with deep placement and removal. Expulsion of one or both rods is more likely to occur when placement of the rods is extremely shallow, too close to the incision, or when the area is infected (Sivin et al., 1998). Implant movement following insertion mostly involve minor changes in position of the implants, but some may involve significant displacement of up to several inches. These factors are usually provider-dependent are thus avoidable (Debra et al., 1996). A third of the clients had the implant reinserted correctly at the same time. This indicates insertion and removal of implants requires well-trained health-care providers, adequate infection prevention and control, waste disposal must be implemented at the service delivery points and personnel must be available every day to perform safe removals upon request.

5.2.4.3 Other medical conditions and implant discontinuation

The study determined that 36.7% of all discontinuations were due to other medical conditions a figure which is almost similar to the Sivin et al., (2002) study which indicated that the removal rates due to medical problems was 35%. The average duration of use of the implant in the study before discontinuation due to medical conditions was 13.64 months a figure lower than that of the overall average at 19.30 months (Table 4.15). According to Sivin et al., (2002), weight gain is more common than weight loss due to the androgen-related increase in appetite, and the average weight change over five years of use is a gain of about 9 pounds with 20% of women gaining at least 10 pounds in the first year and 50% gaining at least 10 pounds by the end of the fifth year of use. However, the study determined that weight loss rather than weight gain was the principal
cause of discontinuation due to weight changes implying that these women may be more
tolerant to weight gain rather than to weight loss.

5.2.4.4 Pregnancy and implant discontinuation

From the study 0.52% of the respondents discontinued due to pregnancy associated
reasons; 0.26% in the first year and 0.26% within the second year (Table 4.15). The first
year discontinuation was at three months after insertion after it was discovered she was
pregnant. Prior to its insertion, she had been on the injectable contraceptive. This
pregnancy could be due to an accidental insertion of an implant on an already pregnant
woman. Sivin et al., (2001) established that release of the hormone sufficient to prevent
conception is reached within 24 hours after placement of the rods and is maintained at an
effective rate for five years and intercourse within these 24 hours may result in a
pregnancy. First-month pregnancies may also occur if the implants are placed sufficiently
late in the follicular stage so that ovulation is not blocked. This could also imply that
proper client selection was not done. Sivin et al., (2002) emphasized that the implant
should be inserted within seven days after the onset of menstrual bleeding to make sure
the woman is not pregnant or immediately following an abortion. If they are inserted at
any other time in the menstrual cycle, the possibility of a pre-existing pregnancy must be
ruled out and a non-hormonal contraceptive method must be used for at least seven days
following insertion to avoid pregnancy. The second year pregnancy was at 14 months of
implant use and the client had been counseled prior to implant insertion. This implies
failure of the implant contraceptive and was above the predetermined failure rate at both
the first year and second year rates of 0.1% (Sivin et al., 2002).
There is therefore a need to identify factors that increase the risk of contraceptive failure beyond the standard method-failure rates which could assist programs to reduce user-enhanced contraceptive failures. The multivariate results show that woman-level variation does not have a significant effect on the likelihood of experiencing contraceptive failure. Exposure to sexual intercourse and the type of method used are the only two factors that have a significant net effect on the likelihood of contraceptive failure (APHRC, 2001). The annual pregnancy rate with implant use per 100 users is at 0.1 at one, two, and three years, 0.0 at four years, and 0.8 at five years. The Pearl Index pregnancy rate is less than 0.2 pregnancies per hundred woman-years and no contraceptive method is 100 percent effective. However, implants do not cause birth defects and do not harm the fetus if a woman becomes pregnant while using the implant or accidentally has implants inserted when she is already pregnant (Sivin et al., 1997). If pregnancy unexpectedly occurs, the rods should be removed (Sivin et al., 2002).

5.2.5 Prior contraceptive used before implant insertion and 5-year implant discontinuation

Majority of the married women in Nairobi use a short term contraceptive with injectables and pills been the most preferred methods at 37.7% and 20.0% respectively (KNBS, 2015). This is reflected in the study whereby the majority of the respondents had been on a short term contraceptives at 68.1% especially the injectable and the pill. The clients who were not using any contraceptive prior to implant insertion were 27.9%. Long term users were only at 3.2% with implant use at 2.7% (Table 4.17). This implies that majority of women were moving from none/short term to a long term form of contraception. This reflects a pool of women of the reproductive age who are sexually
active and desire continuous, long term contraception, are unsatisfied with other reversible methods of birth control and either are not ready for or wants an alternative to permanent sterilization. This switching behavior is commendable as it results in women adopting of an equally, or more effective method of contraception than the one been discontinued (APRC, 2001). Implant discontinuation was however not influenced by what the client had used as a method of contraception previously with a p-value of 0.53 (Table 4.19).

5.2.6 Subsequent contraceptive use and implant discontinuation

The study respondents who discontinued implant use preferred reverting back to short term methods of contraception at 49.1% and they were more likely to adopt a method they had had prior experience with. Thus, injectables were the most common subsequently adopted method of contraceptive. Clients who would prefer a more or equally effective method of contraceptive were at 13.2% with 1.3% preferring the permanent method-female sterilization- of contraceptive (Table 4.18). Majority of those who did not wish to adopt a subsequent contraceptive method did so in order to conceive implying that they had used the implant for spacing purposes. Respondents who were either undecided or failed to adopt a method despite the fact that they did not wish to conceive was at 16%. Such abandonment of contraceptive use while the woman is still in need of contraception should be as worrying because the user is likely to have an unwanted or mistimed pregnancy if a new method is not adopted quickly (APRC, 2010) and 17% of all births in Kenya are unwanted and 26% are mistimed (KDHS, 2010).
5.3 CONCLUSIONS

As a result of the study, it can be concluded that:-

i) The significant factors influencing the five year implant discontinuation in Nairobi are a woman’s number of living children with a p-value of 0.0003, spousal discussion with a p-value of 0.00039, number of years since the last delivery with a p-value of 0.0001 and the actual duration that the implant is used with a p-value of 0.01 with the strongest predictors being spousal discussion and the number of living children a woman has.

ii) The average duration of use of the five-year implant by women of the reproductive age group in Nairobi was 19.3 months.

iii) Short term contraceptives were the most preferred both prior to and subsequent to the five-year implant discontinuation.

The study thus rejects null hypothesis which had stated that there were no significant factors influencing the five-year implant discontinuation amongst women of the reproductive age group in Nairobi, Kenya.
5.4 RECOMMENDATIONS

Based on the findings of the study, the following are recommended:

i. Women considering implants should also be informed that they are likely to experience side effects especially changes in their menstrual pattern and that these changes are not a sign of ill health.

ii. Implant users discontinuing implant use but were either undecided or failed to adopt a method despite the fact that they did not wish to conceive should be followed up as they are likely to have an unwanted or mistimed pregnancy if a new method is not adopted quickly.
5.5 RECOMMENDATIONS FOR FURTHER RESEARCH

i. The findings indicate that side effects are the main cause of the five year implant discontinuation therefore it is recommended that a study be carried out to determine how to minimize the occurrence of such side effects and how they can be managed.

ii. Further research should be conducted on why women preferred short term contraceptives as opposed to long term contraceptives both prior to and subsequent to implant discontinuation.

iii. The study indicates that medical personnel, CBD and IEC materials did not influence the respondents in their decision making process despite their easy access and availability thus further research could be conducted to determine why these community based factors were not been utilized by women using the implant contraceptive.
6.0 REFERENCES


APPENDICES

APPENDIX A: CONSENT FORM

My name is Francis Ngángá a Master’s in Public Health student at Kenyatta University currently undertaking a research on “discontinuation of the five-year implant amongst women of the reproductive age in selected health facilities of Nairobi County, Kenya.” The information will be used to improve the provision of the five-year implant as a contraceptive method in this health facility as well as other facilities in Kenya.

Procedures to be followed

Participation in this study requires that I ask you some questions whose answers I will record in the interview guide. You have the right to refuse to participate in this study. You will receive the same care whether you agree to join the study or not and your decision will not change the care you will receive from the facility today or that you will get from any other facility at any other time.

Participation is voluntary and you may ask questions related to the study at any time. You may refuse to respond to any question and you may also stop the interview at any time without any consequences to the services you receive from this health facility or any other organization now or in the future.

Discomfort and risks

Some of the questions you will be asked may make you uncomfortable. As such, you may refuse to answer these questions if you choose. The interview may add approximately half an hour to the time you wait before you receive your routine services.

Benefits

Participation in this study will enable us learn more about the implants effectiveness in enabling users fulfill their reproductive goals. There will be no direct benefits by participating in the study.

Confidentiality

The interview will be conducted in private and your name will not be recorded in the questionnaire. The questionnaire will be kept in a locked cabinet for safe keeping.
Contact information

If you have any questions feel free to contact the principal investigator Francis Ng’ang’a on 0720829362, Dr. Anthoy Wanyoro on 0722747903 or the Kenyatta University Ethical Review Committee Secretariat on kuerc@ku.ac.ke.

Participant’s statement

The above information regarding my participation in the study is clear to me. I have been given a chance to ask any questions and my questions have been answered to my satisfaction. My participation in the study is entirely voluntary. I understand that my records will be kept private and I can leave the study at any time. I understand that I will receive the same care whether I decide to participate in the study or not and my decision will not change the care I receive from the health facility today or that I will get from any other facility at any other time.

Name of participant (Optional)……………………………………………………………………………………………

Signature/thumbprint………………………………Date……………………………………………………………

Investigators statement

I, the undersigned have explained to the volunteer in a language she understands the procedures to be followed in the study and any risks/benefits that may be involved.

Name of interviewer…………………………………………………………………………………………………………

Interviewer signature…………………………Date…………………………………………………
APPENDIX B: INTERVIEW GUIDE

INTERVIEWER NAME ..............................................................................................................................
INTERVIEW GUIDE NO .............................................................................................................................
DATE AND TIME .........................................................................................................................................
NAME OF HEALTH FACILITY AND SUB-COUNTY .................................................................................

Client’s age in years ....................................................................................................................................

Parity .............................................................................................................................................................

1. Number of living children ........................................................................................................................

2. Year of last delivery .....................................................................................................................................

3. Marital status
   a. Married □
   b. Single □
   c. Separated □
   d. Divorced □
   e. Widowed □
   f. Others (specify) ....................................................................................................................................

4. Religion
   a. Christian □
   b. Muslim □
   c. Hindu □
   d. Others (specify) ....................................................................................................................................

5. Residence .................................................................................................................................................
6. Occupation
   a. Employed
   b. Self employed
   c. Unemployed
   d. Housewife
   e. Others (specify)………………………………………………..

If married, spouse’s occupation
   a. Employed
   b. Self employed
   c. Unemployed
   e. Others (specify)………………………………………………..

7. Education
   a. None
   b. Primary incomplete
   c. Primary complete
   d. Secondary incomplete
   e. Secondary complete
   f. Tertiary

If married, spouse’s level of education
   a. None
   b. Primary incomplete
   c. Primary complete
   d. Secondary incomplete
e. Secondary complete
f. Tertiary

8. Facility of implant insertion
   a. Public facility
   b. Private facility

9. Counseling before insertion
   a. Yes
   b. No

10. Discontinuation timing
    a. Before expiry
    b. After expiry

11. Duration of use (circle appropriately)
    a. Years 1 2 3 4 5
    c. Months 1 2 3 4 5 6 7 8 9 10 11 12

12. Reason for discontinuation
    a. Method failure (conception)
    b. Abandoning use with no further need of contraceptive
       i. To conceive
       ii. Post-menopausal
    c. Abandoning use while still in need of contraception. Reasons
       i. Menstrual changes
          i. Amenorrhoea
          ii. Irregular menstrual bleeding
          iii. Prolonged menstrual bleeding and menorrhagia
iv. Spotting
v. Others (specify)

ii. Incision site factors
i. Pain

ii. Discoloration around the incision site

iii. Others (specify)

iii. Medical conditions
i. Headache

ii. Acne

iii. Backache

iv. Weight gain

v. Weight loss

vi. Nausea

vii. Others (specify)

13. Community cluster variations
a. Contact with CBD
b. Spousal discussion
c. Contact with medical staff
d. IEC material
e. Others (specify)

14. Contraceptive switching trends
a. Prior contraceptive method used before implant insertion
   i. Condom
   ii. Pills
   iii. Injectables
iv. Implant

v. IUCD

vi. Withdrawal

vii. Calendar

viii. Nil

b. Subsequent contraceptive use after implant removal

i. Condom

ii. Pills

iii. Injectables

iv. Implant (reinsertion)

v. IUCD

vi. Withdrawal

vii. Calendar

viii. Nil

Thank you
APPENDIX C: MAP OF KENYA INDICATING LOCATION OF NAIROBI COUNTY

Counties of Kenya

GeoCurrents Map
APPENDIX D: GRADUATE SCHOOL APPROVAL

KENYATTA UNIVERSITY
GRADUATE SCHOOL

E-mail: dean-graduate@ku.ac.ke
Website: www.ku.ac.ke

OUR REF: F57/CTY/PT/23692/11

The Permanent Secretary,
Ministry of Higher Education, Science & Technology,
P.O. Box 30040,
NAIROBI

DATE: 30th October, 2013

Dear Sir/Madam,

RE: RESEARCH AUTHORIZATION FOR MR. FRANCIS NG'ANG'A GICHERU REG. NO. F57/CTY/PT/23692/11

I write to introduce Mr. Gicheru who is a Postgraduate Student of this University. He is registered for M.P.H. Degree programme in the Department of Community Health in the School of Public Health.

Mr. Gicheru intends to conduct research for a proposal entitled, “Discontinuation of the Jadelle Implant Amongst Women of the Reproductive Age Group in Selected Government Health Facilities of Nairobi, Kenya”:

Any assistance given will be highly appreciated.

Yours faithfully,

MRS. LUCY N. MBAABU
FOR: DEAN, GRADUATE SCHOOL

Committee to Creativity, Excellence & Self-Reliance
APPENDIX E: ETHICAL APPROVAL

KENYATTA UNIVERSITY
ETHICS REVIEW COMMITTEE

Email: kuerc.chairman@ku.ac.ke
kuersec.secretary@ku.ac.ke
Website: www.ku.ac.ke

Our Ref: KU/R/COMM/51/286

Francis Ngang’a Gicheru,
Dept. of Community Health, Kenyatta University,
P.O. Box 43844 00100-Nairobi

RE APPLICATION NUMBER PKU/172/1 132 – “DISCONTINUATION OF THE FIVE YEAR IMPLANT AMONGST WOMEN OF THE REPRODUCTIVE AGE GROUP IN SELECTED GOVERNMENT HEALTH FACILITIES OF NAIROBI, KENYA” – Version2

1. IDENTIFICATION OF PROTOCOL
The application before the committee is with a research topic “Discontinuation of the five year implant amongst women of the reproductive age group in selected government health facilities of Nairobi, Kenya” – Version 2, dated 13th January, 2014.

2. APPLICANT
Francis Ngang’a Gicheru, Dept. of Community Health, Kenyatta University

3. STUDY SITE
Government health facilities of Nairobi

4. DECISION
The committee has considered the research protocol in accordance with the Kenyatta University Research Policy (section 7.2.1.3) and the Kenyatta University Ethics Review Committee Guidelines AND APPROVED that the research may proceed for a period of ONE year from 13th February, 2014.

5. ADVICE/CONDITIONS
i. Progress reports are submitted to the KU-ERC every six months and a full report is submitted at the end of the study.
ii. Serious and unexpected adverse events related to the conduct of the study are reported to this board immediately they occur.
iii. Notify the Kenyatta University Ethics Committee of any amendments to the protocol.
iv. Submit an electronic copy of the protocol to KUERC.

When replying, kindly quote the application number above.
If you accept the decision reached and advice and conditions given, please sign in the space provided below and return to KU-ERC a copy of the letter.

[Signature]
13 Feb 2014

PROF. NICHOLAS K. GIKONYO
CHAIRMAN ETHICS REVIEW COMMITTEE

I, ………………………………., accept the advice given and will fulfill the conditions therein.

Signature: ………………………… Dated this day of …………………… 2014.

cc: Vice-Chancellor
Director: Institute for Research Science and Technology
APPENDIX F: NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION APPROVAL

NATIONAL COMMISSION FOR SCIENCE, TECHNOLOGY AND INNOVATION

NACOSTI/P/14/0357/1004

Dr. Francis Nganga Gichuru
Kenyatta University
P.O.Box 43844-00100
NAIROBI.

RE: RESEARCH AUTHORIZATION

Following your application for authority to carry out research on “Discontinuation of the five-year implant amongst women of the reproductive age group in selected government health facilities of Nairobi, Kenya,” I am pleased to inform you that you have been authorized to undertake research in Nairobi County for a period ending 31st August, 2014.

You are advised to report to the County Commissioner, the County Director of Education and the County Coordinator of Health, Nairobi County before embarking on the research project.

On completion of the research, you are expected to submit two hard copies and one soft copy in pdf of the research report/thesis to our office.

DR. M. K. RUGUTI, FED. HSC.
FOR: SECRETARY/CEO

Copy to:
The County Commissioner
The County Director of Education
County Coordinator of Health
Nairobi County.