CONTRACEPTIVE USE DYNAMICS
IN KENYA, 2003-2014

BY

MARGARET WAMBUI KUNGU

Q80/95227/2014

A THESIS SUBMITTED IN PARTIAL FULFILMENT FOR THE DEGREE OF DOCTOR OF PHILOSOPHY IN POPULATION STUDIES OF THE UNIVERSITY OF NAIROBI

2021

DEDICATION

To daddy and mum, the late Rev John Kungu Kimuura and Grace Motho, for giving me the great gifts of love of God and education. Your dreams live on in me, your intercession works.
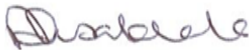
DECLARATION

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

Signature   Date **30th August 2021**

Margaret Wambui Kungu

This thesis has been submitted for examination with our approval as University Supervisors.

i.   Signature   Date **31st August 2021**

Dr Anne Khasakhala

ii.   Signature   Date **31st August 2021**

Prof A.T.A Otieno

Population Studies and Research Institute,

University of Nairobi

ACKNOWLEDGEMENT

ABSTRACT

This study presents the findings of an investigation of the dynamics of contraceptive use in Kenya from 2003 to 2014 using Kenya Demographic and Health Survey (KDHS) data from three surveys conducted during that period. The study sought to highlight the impact of contraceptive discontinuation on retention of contraceptive users in the study period and the critical role played by the method chosen. It examined on a national scope, the trends in contraceptive use and the determinants of method choice and discontinuation using cross-classification and life tables for descriptive analyses, while multinomial logistic and Cox proportional-hazards methods were used in regression analyses.

Over the course of their reproductive life course, women and/or their spouses change their family planning choices in an intricate process governed by various factors. The understanding of these shifts is important for both policy and service delivery in order to meet the reproductive needs of women and/or spouses, minimise unmet need and contraceptive discontinuation and hence unwanted fertility. Although there have been comprehensive studies on the issues of choice of methods and subsequent discontinuation, there is a lack of comprehensive analysis since the publication of the KDHS 2008/2009. This study sought to answer three critical questions for assessment and policy concerns. 1) What are the trends in contraceptive method choice? 2) What factors influence method choice? 3) What factors influence contraceptive discontinuation?

The study revealed a phenomenal change of high prevalence of modern contraception occurred between 2008 and 2014. The overall picture presented was that of consistently rising prevalence of modern contraceptive methods among women of all ages, especially among younger women aged 15-24 and those from the rural areas and lower wealth status. There was a general shift in the use of contraceptive methods from short-term to long-acting reversible contraception (LARC), more so implants. The factors of age, residence, education, type of contraceptive, region and wealth emerged as determinants of contraceptive method choice, while the predictors of discontinuation emerged as the method of contraception and age. The overall rates of discontinuation at 12 months were 30%, for 24 months 37% and for 36 months 74%.

The conclusions suggest the reaping of benefits from the repositioning and scaling up of family planning campaigns after the stagnation revealed in KDHS 2003. This was shown in the uptake of modern methods of contraception, especially the more effective ones. The study recommends more research on issues of side effects among contraceptive users of secondary education and among method switchers. On policy, the high demand for LARC calls for sustainable investments in their supply and regular training of service providers, as the methods are provider dependent. Further, comprehensive counselling and follow-up should be implemented to deal with issues of side effects, hence reduction of discontinuation.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

LIST OF ACRONYMS

CEB	-	Children Ever Born
CMC	-	Century Month Code
CPR	-	Contraceptive Prevalence Rate
DHIS	-	District Health Information System
DHS	-	Demographic and Health Survey
FP	-	Family Planning
HIV	-	Human Immuno Deficiency Virus
ICPD	-	International Conference on Population and Development
IUD	-	Intrauterine Device
KDHS	-	Kenya Demographic and Health Survey
KHSDIS	-	Kenya Health Service Delivery Indicator Survey
KSPA	-	Kenya Service Provision Assessment
LAM	-	Lactational Amenorrhea Method
LARC	-	Long-Acting Reversible Contraception
mCPR	-	modern Contraceptive Prevalence Rate
MoH	-	Ministry of Health
PMA	-	Performance Monitoring Accountability
PMTCT	-	Prevention of Mother to Child Transmission
RH	-	Reproductive Health
RMNCAH	-	Reproductive, Maternal, Newborn, Child and Adolescent Health
SAC	-	Short Acting Contraception
SDG	-	Sustainable Development Goals
SPSS	-	Statistical Package for the Social Sciences
STI	-	Sexually Transmitted Infection
TFR	-	Total Fertility Rate

CHAPTER 1

INTRODUCTION

1.1 General Introduction

Social, environmental and economic variables affect fertility indirectly through biological and behavioural factors named proximate determinants of fertility. Contraceptive use, according to Bongaarts, is a proximate determinant of fertility and has the greatest influence on fertility transition (Bongaarts and Potter, 1983).

To understand fertility change, especially in developing countries, there is need to understand contraceptive use. A family planning programme of high-quality service can drive a country to near replacement fertility more than would result solely from its level of development as seen in Bangladesh, which reached a total fertility rate (TFR) of 3.3 despite not scoring highly on many development indicators (Cleland et al, 2012). As at 2014, Kenya's TFR was 3.9 births per woman, while the contraceptive prevalence rate (CPR) was 58%. Modern contraceptive prevalence rate (mCPR) was 53% (KNBS, 2015).

Contraceptive use dynamics are the changes that occur in contraceptive use and why they do. It involves two main processes - contraceptive method choice and discontinuation. Contraceptive choice is the process by which individuals make a choice for or against a specific method. Contraceptive discontinuation is the act of starting use of a contraceptive method/device then terminating use within the first 12 months after initiation while still not intending to get pregnant. It includes switching from one method to another (Khraif et al, 2017; Chaurasia, 2014).

Contraceptive users can only realise their reproductive aspirations if they use contraceptive methods continuously and effectively. Studies on contraceptive use dynamics give a basis to improve family planning programmes, while studies on the status of discontinuation of contraception can point out concerns and gaps in the provision of services and thereby give direction on how to improve family planning programmes. (Mumah et al, 2014; Blanc et al, 2002; Ali, 2001).

A possible connection between choice of a contraceptive method and its discontinuation rate has been hypothesised and method selected has been found to be a significant predictor of discontinuation. Method characteristics have been shown to directly influence contraceptive

discontinuation rates, by their influence on the risk of discontinuing a method and indirectly because they influence the choice of a method. The interplay between acceptance of a method and discontinuation determines the overall contraceptive rate, which directly influences fertility outcomes, hence the need to understand the dynamics involved (Magadi and Curtis, 2003).

A close look at the contraceptive dynamics situation in most countries reveals that over 30% of users discontinue contraception during the first initial 12 months and over 60% discontinue within 36 months from various causes. This is a phenomenal challenge for managers of family planning programmes, as it waters down the various efforts to scale up use of family planning methods and limits the desired outcome of reducing unwanted pregnancies (Castle and Askew, 2015; Mahmud et al 2015; Ali et al, 2012). Mahmood and Naz, (2012) found that eliminating discontinuations resulting from side effects might increase continuation rates (at 12 months) by 10%, while eliminating method failure might raise continuation rates (at 12 months) by up to 6%.

Despite the great strides in contraceptive prevalence, unmet need for contraception is still high. Unmet need consists of two categories of women: never users (those who have never used a modern method) and past users (those who started using a modern method but stopped after a period (Jain et al, 2013). Globally, there are currently about 215 million women with demand for modern contraceptive methods that has not been met. The women contribute 82% of unwanted pregnancies, some of which may result in negative outcomes for the women as well as their families. Unwanted pregnancies may end up in unsafe abortions, which can lead to complications and even death. If the demand for contraception was met and the women were able to use contraceptives, possibly the lives of 251,000 women would be saved (Bertrand et al, 2015).

Reducing abortion can certainly reduce costs of health care. A recent study in Kenya found that in 2012 alone, 464,690 women underwent induced, unsafe abortions and sadly, they were undertaken by people with no skills. The study revealed that 119,912 of these women suffered complications and sought treatment, with 75,581 of them obtaining treatment in public facilities. Of those who sought post-abortion care, 77% were suffering from various complications ranging from moderate to severe, which if unattended could lead to death. As a result, KSh433 million was spent in public facilities on treating these post-abortion complications with severe complications claiming 54% of the total costs. The study adduces

that the government spends more than KSh500 million annually to provide post-abortion treatment, with one individual spending about KSh5,000 (MoH et al, 2018).

Contraceptive prevalence rate (CPR) and maternal and child mortality rates have an inverse relationship. Contraceptive use can reduce maternal and neonatal mortality rates and hence enhance child survival. It can also reduce rates of unsafe, induced abortion through assisting women to avoid unwanted pregnancies. Prevention of mother to child transmission of HIV (PMTCT) is another benefit and is listed by the World Health Organization (WHO) in its package for PMTCT (WHO, 2007).

Use of contraception can help prevent 30-44% of maternal deaths as it assists women to space/delay births and thus get pregnant when they want. Women of higher parity can especially benefit from reduced possible negative effects of many births. In general, women can also be able to join the labour force much more when they do not constantly have young children to look after (Bertrand et al, 2015; Ahmed et al, 2012). In 2014, Kenya recorded a maternal mortality ratio of 362 per 100,000 live births (KNBS, 2015).

Family planning enhances gender equality and women empowerment. When women can access and use their preferred contraceptive method, they are empowered to determine the timing, number and spacing of their births. Therefore, their reproductive health and human rights are upheld and they can consequently achieve higher education, which can improve their status in the community. Universal access to reproductive health and contraceptive commodities will likely fast-track cost-effective, sustainable human and national development for low resource countries. Women who were exposed to maternal and child health programmes in a study in Bangladesh were found to have less children with more spacing between births as well as higher incomes to individual and households than women or households not in the programmes (Tsui et al, 2010).

Contraceptive use is a game-changer in reducing unsustainable population growth rates common in low resource countries and the resultant negative effects on the environment, economy, national and international development efforts. A controlled population growth will free up resources for improving infrastructure, social services and reduce the burden on the national budget. This would result in among others, benefits of a population with better education and more labour skills. Use of contraception additionally allows families to enjoy the quantity-quality trade-off where they can provide a better-quality life for their fewer children. The opportunity cost in terms of time faced by women with high levels of education

is what drives them to getting fewer children than their less educated counterparts (Nonvignon and Novignon, 2014).

Contraceptive uptake has scaled up in most countries globally and more so in Latin America and Asia, but is persistently lower in sub-Saharan Africa. The use of modern contraceptive methods in the world has improved marginally from 54% to 57%. In Africa, it improved from about 24% to 29% between 1990 and 2015 (WHO, 2018).

There have been renewed national and international commitments by governments, non-government and private sector organizations across countries almost worldwide since 2010 to revitalize and reposition family planning programmes in response to increased maternal, child health and population programs challenges (UN, 2015). These efforts have increased focus and funding and set ambitious targets for the programmes.

With this new focus came the family planning initiative dubbed FP2020 comprising countries, funding agencies, development partners and researchers from across the globe. The initiative, launched in 2012, harnesses efforts to accelerate actions geared towards improved access to and use of family planning services. A twin initiative of FP2020 is Performance Monitoring and Accountability 2020 (PMA2020) that monitors key indicators for family planning by use of innovative mobile technology in low-cost surveys. The project is driven by research entities and local universities and is present in 11 countries. The Ministry of Health and other partners are implementing the project in 11 counties in Kenya (FP2020, 2017; PMA, 2017).

One of the key issues that has been singled out as vital in the process of development since the International Conference on Population and Development (ICPD) of 1994 is enhanced access to reproductive health. This issue has also been given prominence in Sustainable Development Goal (SDG) 3.7 whose target for family planning is attainment of universal access by the year 2030 (New et al, 2017).

Kenya is a leader in family planning in Africa and has been a part of these efforts to revitalize family planning. In 2006, after focusing on HIV/AIDS for a decade, family planning programmes in Kenya were integrated with HIV/AIDS programmes, thus benefited greatly in terms of facility infrastructure, preventive education, demand generation using integrated outreaches, peer educators and increased supply of condoms (FHI et al, 2006). Thereafter, the family planning programme was re-launched in 2011 and in 2012 when the agency charged with advising the government on population matters developed a comprehensive national population policy (NCPD, 2012a).

Kenya has been an active member of the FP2020 movement and has reviewed its family planning targets to be more ambitious in line with FP2020 targets. Kenya is also engaged in many efforts to improve family planning and population programmes. Other improvements/innovations in the policy environment include Family Planning Guidelines, Family Planning Costed Implementation Plans, the Health Act, Kenya Health Policy, Reproductive Health Strategies, Kenya Reproductive, Maternal, Neonatal, Child and Adolescent Health (RMNCAH) Investment Framework and Strategy for Community Health.

This synergy of efforts is because evidence has proved that family planning can cascade benefits to many people at reduced cost like no other technology can. Investing in it is very cost-effective and has the potential to save healthcare costs for countries. In 2015, Kenya had cumulatively saved KSh381 ($4.48) in direct costs of healthcare per every KSh85 (US$1) that had been spent on FP. If county governments could generated demand for modern contraception, the savings realized would increase to KSh464 (US$5.46) per every KSh85 (US$1) utilised in FP. This would directly result in total savings of KSh6.8 billion or (US$80 million) by 2020 (HPP et al, 2014).

Women who use modern contraceptive methods have been associated with less average fertility in comparison with those using other methods of contraception (Bbaale and Mpuga, 2011). As at 2015 globally, 90% of contraceptive use comprised of modern methods. Married or in-union women in the reproductive age contributed 57% of these modern method users (UN, 2015) hence the focus of this study on modern methods only.

The national goal of the family planning programme is scaling up modern contraceptive uptake to reduce unmet need, discontinuation and thus unwanted fertility. This study therefore attempted to document current evidence on the way contraceptive method choice in Kenya was evolving in terms of method mix and profiles of users, their age groups and socio-economic status. It interrogated the dynamics of contraceptive choice behaviour in Kenya over the period 2003 to 2014, with a focus on modern contraception.

To satisfy the outcome of interest in the study, which was contraceptive discontinuation, the study revolved around two essays - contraceptive method choice and contraceptive discontinuation.

1.2 Problem Statement

Over the course of their reproductive life course, women and/or their spouses change their family planning choices. The process is however intricate and is governed by various factors.

The understanding of these shifts is important for both policy and service provision so as to meet the reproductive needs of women and/or spouses and country fertility targets (Skogsdal et al, 2018; Haddad et al, 2013; RamaRao and Mohanam, 2003). Over time, users of contraceptives may choose to start, switch methods or stop methods to meet their preferences and needs. These are important in the delivery of high-quality client-centred services to enable couples initiate the best family planning choice. The reasons for the course of action are varied but are often linked to starting a family, onset of menopause, separation from a partner, method related side effects or lack of preferred methods (Ross et al, 2015; Magadi and Curtis, 2003).

Although there have been comprehensive studies on the issues of choice of methods and subsequent discontinuation, there is a lack of comprehensive analysis since the publication of the KDHS 2008/9. Three critical questions for assessment and policy concerns arise. 1) Have the factors that influence the choice of methods changed or remained the same? 2) And if so, what factors influence continuation or discontinuation of the methods chosen? 3) Are there differences between the younger and older women, between the women in lower socio-economic strata and those belonging to high socio-economic strata?

Previous studies highlight that unmarried younger women have high discontinuation rates that conflict with their desire for contraception. The group of 15-24 years old women have high risk for unintended pregnancies and scale up the needed efforts for retaining contraceptive users (NCPD, 2013; Magadi et al, 2001). Other studies in Kenya have found the factors of education and wealth as significant influencers in use of contraception (Kimani et al., 2013). Magadi et al, (2001) also reported consistent variations in the dynamics of contraceptive use in Kenya based on these factors.

This thesis sought to examine whether there had been a consistent change in the overall use dynamics, amid rapid increase in use and changing method mix since 2003. Studies have shown that as current use of contraceptives rises, continuation turns into a critical measure of general programme effectiveness on whether users are realizing their reproductive health goals. Programmes should concentrate more on keeping current users satisfied and encouraging return to use among clients who had discontinued rather than in recruitment of new users (Birhane, 2014; Hubacher et al, 2012; Koenig et al, 1997). The rationale is that future increases in contraceptive use will depend more on retention of users and encouraging re-adoption to past users than on new acceptors in view of the fact that mistimed and unwanted pregnancies mostly arise from discontinuation of contraception rather than non-use of contraception (Castle and Askew, 2015, Magadi et al, 2001; Jain, 1989).

Research Questions

i   What are the trends in contraceptive method choice?

ii   What factors influence contraceptive method choice?

iii What factors influence contraceptive discontinuation?

1.3 Objectives

General Objective

To highlight the impact of contraceptive discontinuation on retention of contraceptive users.

Specific Objectives

- Establish the prevailing trends in contraceptive method choice.
- Identify the determinants of method choice.
- Examine the determinants of contraceptive discontinuation.

1.4 Justification

As the contraceptive prevalence rate (CPR) increases, it is important to gauge retention of contraceptive users as a measure of quality of services. Since it is difficult to measure retention, the alternative is to study discontinuation, which is the opposite of retention, so that a family planning programme gets a picture of whether it is likely to retain the high numbers of contraceptive users. A starting point is to look at the supply and demand factors around method choice, and the characteristics of women who are more/less likely to discontinue, which consequently sheds light on factors that influence discontinuation. Consequently, interventions can be put in place to understand how best to address the concerns of discontinuing users. This would enable the retention of more users to meet the reproductive needs of women and countries, helping to avoid the 'leaking bucket' phenomenon in family planning (Jain, 2014; Fischer, 2013).

Several studies based on demographic and health survey (DHS) data have shown that reversible modern methods are associated with high rates of discontinuation. Many women who have initiated use of a modern method will discontinue their use even when they do not want to become pregnant (Bradley et al, 2011). There is need to know the dynamics involved in contraceptive use and continuation/discontinuation as well as what determines the choices (Salhan and Triparthi, 2004; Magadi and Curtis, 2003; Bulatao et al, 1989). Method selected has been found to be the most significant predictor of discontinuation as cited in the discontinuation rates for various methods, especially hormonal ones due to the issue of health

concerns (Ali et al, 2014; Ali M et al, 2012). However, studies on discontinuation have not given method choice the central role and have divided attention among the numerous factors identified as influencing it.

There is increased demand for contraception globally and in Kenya due to a huge cohort of young people aged 10-24 who are entering the reproductive age (KNBS, 2019). These young people start sexual activities early but marry later and there is increased need for contraception outside marriage, as many want to avoid pregnancy to continue with their education programmes. If the supply to meet this growing demand is not provided, adolescent and young girls are likely to face the risk of unintended pregnancies and unsafe abortions. To meet their growing reproductive health needs, comprehensive youth-friendly services and/or contraceptive choices need to be made available. Studies on contraceptive use dynamics are also necessary to generate evidence to guide such programmes (IPPF, 2011).

In conformity with this scenario, the population structure in Kenya has been changing towards a bigger percentage of a younger population becoming the majority. Consequently, contraceptive use dynamics have been changing as contraceptive users become younger and new methods of contraception are introduced. The reproductive health aspirations of unmarried younger women differ from the ones of older married women who are the main target of the family planning programme in Kenya.

If discontinuation rates are high as many previous studies show, and discontinued users fail to switch to effective methods of contraception, the impact on fertility might be considerable. The level that public and private health programmes can address the increasing need for effective reproductive health services progressively will significantly influence CPR upwards and consequently total fertility rate (TFR) downwards (Castle and Askew, 2015; Jain, 2014).

Among the FP2020 2017 targets to address unwanted fertility in Kenya are to:

- Increase modern contraceptive prevalence (mCPR) to 66% from 61% by 2030.
- Increase CPR among adolescent girls aged 15-19 years to 50% from 40% by 2020.
- Reduce teenage pregnancy among adolescent girls aged 15-19 years to 12% from 18% in 2020 (FP2020, 2017; MoH, 2017).

Evidence generation for monitoring these targets is vital. Challenging these ambitious targets is the 31% contraceptive discontinuation that Kenya registered in KDHS 2014. If contraceptive discontinuation was reduced, CPR would increase substantially, as contraceptive discontinuation is a contributing factor to low CPR (Huda and Chowdhury, 2014).

Contraceptive use is one of the pillars for the success of the Sustainable Development Goals (SDGs). As such, there is need to have up-to-date data and information that allows monitoring and assessment of progress made towards achieving of the SDGs in general and examining the factors that influence achievement of family planning goals. Successful family planning programmes are critical to achieving universal access to sexual and reproductive health (RH) care as envisioned in SDG3. High levels of unwanted fertility among adolescents in Kenya with a bulging youth population may limit their participation in education and the economy, thus delaying achievement of the demographic dividend (NCPD 2015a; Castle and Askew, 2015).

Despite great improvements in maternal health with maternal mortality rates dropping from 590 per 100,000 live births in 1998 to 488 in 2008/2009, the figures for maternal mortality in Kenya are still high at 362 per 100,000 live births (KNBS, 2015). If increased contraception by reducing the incidence of unintended pregnancies can help bring down the figures, all efforts should be made to improve the environment for scaling up use of contraceptives. Studies that can shed more light on the choice and continued use of contraception ought to be undertaken.

Discontinuation of contraceptives is a major challenge in Kenya because most of the discontinuing clients do not switch to alternative methods but expose themselves to the risk of unintended pregnancies, with their resultant adverse health and social consequences and effects on the country's fertility (Ali et al, 2014; Ali and Cleland, 2010). It is one of the topics identified as needing more research in the document 'Research Agenda on Population and Development in Kenya', so that evidence can be generated to guide family planning programmes on issues of method mix and factors that influence continuity/non-continuity of contraceptive use (NCPD, 2015b)

Sessional Paper no. 3 of 2012 containing the Population Policy for National Development for Kenya targets to push CPR to 62% by 2020 and to 70% by 2030 to reach a TFR of 3.4 by 2020 and 2.6 by 2030 (NCPD, 2012a). Minimizing contraceptive discontinuation will help Kenya achieve these targets.

The last known contraceptive use dynamics studies in Kenya were before 2004. Thus, there is no known recent national study on contraceptive use dynamics in Kenya. The focus of most family planning programmes has been only to increase the contraceptive prevalence without focus on the retention of the users. Given the extent of dissatisfaction manifested in contraceptive discontinuation, more clarity on contraceptive options may assist women to find

their optimal method and meet their reproductive health goals, while Kenya would meet its population goals and international commitments (Gomez and Clark, 2014).

Despite concerted efforts to manage the population growth rate to a level that is consistent with its socio-economic development, Kenya's growth rate at 2.9% remains high. The population is set to double from 38.6 million in 2009 to 77.3 million in 2050. The growth rate needs to be reduced to harmonize with the economic growth and social development envisioned in Vision 2030 and to attain the SDGs.

Addressing unmet need for family planning will assist Kenya scale up the contraceptive prevalence rate and consequently decrease the total fertility rate. With the current focus being to increase uptake of modern and especially long-acting reversible contraception (LARCs), understanding the underlying factors that determine the choice and use of modern contraceptives will result in a giant step towards attaining the population policy targets for Kenya. Key to this is the continued success of the family planning programme (NCPD, 2013; 2012a).

Demand creation for family planning to reduce unmet need has also been generated through efforts by several non-governmental partners including APHIA II, AMUA and TUNZA projects. Other supplementary efforts that have improved support for family planning are increased funding for the health sector from 2002, where the FP commodities budget line was increased from KSh200 million to KSh520 million between 2005 and 2010. It is important to monitor whether these initiatives have achieved the targeted outcomes and impact (MoH, 2012).

Although contraceptive trends and determinants in Kenya have been studied previously, it is vital to highlight current trends, as the situation has most likely changed with time, policy environment and the population structure. A lot of ground has positively shifted for family planning with numerous policy documents since 2007. These include the Constitution of Kenya, 2010, Vision 2030, and Ministry of Health policies, guidelines and strategies that have generated a lot of demand for family planning. The devolved system of government has shifted family planning programme efforts to the counties, where programme efforts may vary. In addition, the international forum has brought FP2020 and SDGs, all with targets and indicators to accelerate family planning that need close monitoring through regular studies. Current data on coverage of contraceptive use and the gaps in service provision can go a long way in boosting these initiatives (Chersich et al, 2017).

On the supply side, new methods have come into the market in the form of implants and improved IUDs and injectables. There has been an increasing uptake of newer and more effective contraceptive methods amid the interplay with socio-demographic factors. It is therefore important to identify the continuously changing profiles of users and what is driving their choice of methods in this different time setting from the previous studies on Kenya.

1.5 Scope and Limitation

The study was national in scope and based on three samples of all married and single women aged 15-49 who registered current use of contraception in the five years prior to the three KDHS cycles - 2003, 2008/2009 and 2014 for the investigation on the trends and determinants of contraceptive method choice. Those who reported not using a major modern method of contraception (pills, condom, injection, IUDs, implants, sterilization) were excluded from the analysis on determinants of method choice.

On the study of discontinuation, KDHS 2014 data only was used focusing on those who had discontinued within the 36 months' period before the survey from a sample of 6961 women who reported having discontinued contraception within the five years before the survey. The methods of focus for the discontinuation analysis were pills, injection IUDs and implants. The study on discontinuation excluded the three months prior to the 2014 KDHS to avoid possible bias from underreporting of pregnancies in the first trimester, which may lead to underestimates in contraceptive failure rates (Magadi, 2001; Curtis and Blanc, 1997). It grouped the types of discontinuation into three categories: switching, abandonment while in need and other (method failure and discontinuation for no need).

The DHS primarily collect detailed information on reproductive health histories, especially on contraceptive use and may only provide standard information on socio-economic factors and hints of the cultural context. This in spite of the issues being vital to understanding well the reasons behind contraceptive choice and continuation and the characteristics of the women who discontinue contraception.

Data on contraceptive use and discontinuation in the DHS calendar is also retrospective, hence may be subject to recall bias. However, reported data on contraceptive use in Kenya and elsewhere have been proved to be quite reliable. Calendar data collected retrospectively closely mirrors data collected in periodic surveys and have not shown worrying over-reporting or under-reporting patterns (Callahan and Becker, 2012; Moreau et al, 2009; Rossier et al., 2004; Magadi, 2001; Strickler et al, 1997).

Performance Monitoring and Accountability (PMA2020) annually collects survey data at national and county levels in urban and rural settings to provide estimates of key indicators for monitoring progress in use of family planning, but their data is not national.

1.6 Outline of the Thesis

The thesis is organised into seven chapters covering different sections as follows: Chapter 1 - Introduction, Chapter 2 - Literature Review and Theoretical Framework, Chapter 3 - Methodology, Chapter 4 - Trends in Contraceptive Method Choice, Chapter 5 - Determinants of Contraceptive Method Choice, Chapter 6 - Factors Associated with Contraceptive Discontinuation and Chapter 7 - Summary, Conclusions, and Recommendations.

CHAPTER 2

LITERATURE REVIEW AND THEORETICAL FRAMEWORK

2.1 Introduction

The review of the literature has been broadly divided into two issues: method choice and contraceptive discontinuation to assemble available information on the two related processes. A comprehensive review of literature was undertaken first as a basis for establishing the trends and determinants of method choice, and secondly on determinants of contraceptive discontinuation in Kenya.

Though the focus of the study was Kenya, references from around the world were included to provide a greater understanding of the topic and comparability. The literature review presented in the section includes data from both published and unpublished articles, academic papers as well as programme reports.

Studies on trends in contraceptive method use are very important because they provide data on the prevalence of different contraceptive methods as well as profiles of contraceptive users in terms of who they are, where they are and their characteristics such as age. This information has recently become increasingly important in the light of much-needed evidence to guide the prevailing rights-based approach to family planning, the FP2020 campaigns, policy reviews for high-impact programme focus targets and a balanced method mix. As such, many studies are being conducted globally and results have been revealing new and more information on the dynamics of contraceptive use, method choice and method dis/continuation.

2.2 Trends in Contraceptive Use and Method Mix Globally

In general, contraceptive use has been increasing globally and by 2017 there were 58% married or in union women who were using modern methods. They represented 92% of contraceptive users of all methods while in Europe, North America, the Caribbean and Latin America, use was over 70%. In Africa, contraceptive use stood at 36% but Eastern and Southern African regions had much higher prevalence than the continental average, while the Western and Middle regions were below 25%. Use of modern contraception is what has driven the increase in contraceptive use globally and currently the trend shows a rise in use of LARC methods, especially the implants (WHO, 2018; UN, 2017). LARC refers to long acting reversible contraceptive methods, which can remain in use for more than a year after insertion and comprise of intrauterine devices (IUDs) and implants. They have higher effectiveness, patient acceptability and fewer user contraindications (Tsui et al, 2017).

Studies on contraceptive use reveal a heavily imbalanced method mix (variety of methods). The most popular methods globally have been female sterilization and IUDs with over half of the prevalence. This is a common trend, especially in developing countries that one or two methods dominate the method mix by big margins. Eastern and Southern Africa regions have been lately reporting declines in the use of female sterilization and IUDs and increasing use of injection such that injection dominates in prevalence in most countries (Ross et al, 2015). The injection had 43% of the share in modern contraceptive use (mCPR) in sub-Saharan Africa, 49% in Eastern Africa and 46% in Southern Africa (Jacobstein and Polis, 2014). However, implants are closing in on injection in many countries in Eastern and West Africa (Ross et al, 2015; Hembah-Hilekaan et al, 2018). The pill has maintained the lead only in Zimbabwe, with a prevalence of over 40% while female sterilization has been taking the lead in Malawi with a prevalence of over 10% ((UN, 2015; Jacobstein, 2013). IUDs have not done well in Africa and have a prevalence of only 4% but performance is worse in sub-Saharan Africa at a marginal prevalence of 0.5% (Ross et al, 2018).

2.3 Trends in Contraceptive Use and Method Mix in Kenya

Trends in contraceptive prevalence rates in Kenya from 2003 to 2014 show significant increases from 39% in 2003 to 46% in 2008/2009 to 58% in 2014. This is an increase of 19 percentage points, which is remarkable (KNBS, 2004; 2010; 2015). The increase in CPR can be explained by the increase in the uptake of modern contraceptive methods. From 2003 to 2014, use of modern contraceptive methods among women who were currently married increased from 32% to 53% while use of traditional methods declined from 8% to 5% for the same group of women. The number of women who have used contraception previously is also increasing. Past users are more likely to re-adopt contraception in the future when their current situation of less need for contraception changes.

Kenya's contraceptive prevalence rate (CPR) is among the highest in sub-Saharan Africa at 58% and changing trends in contraceptive use emerge every five years from the KDHS surveys. The trends in CPR point to the potential for increased contraceptive use. However, the challenge of maintaining current users while satisfying past users who cited health concerns for discontinuation and who want to reinitiate use remains. In addition, modern methods have higher discontinuation rates, resulting from side effects and health concerns. Thus as their use increases, the issue of discontinuation should be given additional focus (Ali et al, 2014; NCPD, 2013).

The KDHS of 2014 generated new DHS data which documented significant progress that had been made in crucial FP indicators, especially increased CPR driven by modern methods, declining TFR and unmet need for contraception. The data also exposed glaring regional differentials in CPR. Two counties of Kirinyaga and Makueni had CPR of over 80% each while two others Mandera and Wajir, had extremely low CPR of 2% each. Some 22 counties were above the national average of 58%. This scenario presents opportunities for Kenya to push the contraceptive prevalence rate further up by increasing CPR in the counties with low CPR (KNBS, 2015). On the negative side, the survey reported 18% unmet need for family planning, 35% unplanned births and 30% (12 month) discontinuation rates, also reflecting huge regional and socio-economic disparities.

Additional, more regular data on the family planning status in Kenya to complement KDHS data is available in current reports from FP2020, PMA 2020 Country Reports and the District Health Information System (DHIS) service statistics reports. The global initiative FP2020 develops annual country reports on 17 core indicators of family planning, while the DHIS provides service statistics directly from health facilities to the lowest level. All the data from the various sources agree on the overwhelming improvements in key indicators of family planning.

Contraceptive use has continued to increase and peak between the ages of 25 to 39 from 2003 to 2014, but the highest use is reported for the age group of 30-34 years throughout the period. The trend is also seen in the increase in the number of women in both rural and urban areas who were using contraception. In 2003, 48% of women using contraception were in urban areas and the figure had increased to 62% in 2014. In 2003, 37% of women who were using contraception were living in rural areas and the figure had increased to 56% in 2014 (KNBS, 2004; 2010; 2015).

A continuing trend is the issue of more educated women using contraceptives more than their less educated counterparts do. In 2003, only 12% of women with no education were using contraception whereas 62% of women with secondary or higher level of education were using contraception. In 2014, the number of women with no education using contraception had increased to 18% and the number with secondary or higher education to 65%.

On wealth, use of contraception has continued to increase among all quintiles but the huge gap in use of contraception between the lowest and highest quintiles persists. In 2003, 18% of women using contraception were from the lowest quintiles whereas 52% were from the highest

quintiles. In 2014, those from lowest quintile had increased to 32% while those from the highest quintile had increased to 64% (KNBS, 2004; 2010; 2015).

2.4 Determinants of Contraceptive Method Choice

With the increasing contraceptive prevalence and new knowledge of different methods, the importance of contraceptive choice in research and policy has likewise risen. The quest to understand why couples choose a method to regulate their fertility is now a matter of great interest (Bulatao et al, 1989).

Contraceptive method choice is the process by which individuals decide to choose or reject a method of contraception thereby influencing fertility. The choice of a method is influenced by the characteristics of an individual, their community including access to contraception as well as family planning programme environment (RamaRao and Mohanam, 2003; Entwisle et al 1997; 1996; Bruce 1990).

Bulatao and Lee (1983) identified contraceptive choice as an important, unresolved issue and emphasized the need for better understanding about the factors underlying the issue. The focus was how an individual chooses one method or a combination of methods from the options available. They proposed a radical hitherto unexplored approach of studying an individual woman and the steps she makes in choosing contraception. They hypothesized that steps may start from initiation into contraception and the timing, followed by the adoption of a first method, then continuation or discontinuation and maybe another choice of a different contraceptive method.

They viewed the process of method choice as one where several options of methods are progressively narrowed to a smaller range. This would eventually narrow down to a particular choice influenced by the many interrelated economic, cultural, technical, psychological and other factors as happens in a funnel. Three qualifications should be noted in the scenario: i) that the funnel could be broadened to include other factors influencing fertility, ii) that successive layers could partly filter the methods and more importantly, iii) that the flow in the funnel is not always downward. The understanding of method mixes is complicated by the interplay of supply (top) and demand (bottom) factors (Bulatao and Lee, 1983).

The choice of a particular contraceptive method appears to be heavily influenced by the method options availed by family planning service providers. Contraceptive access is a critical factor, but potential method users have an active role in the assessment and selection from among the options they have (Magadi and Curtis, 2003; Bulatao et al, 1989).

In the dynamics of contraceptive use, the choice of method is vital in assessing the quality of services in view of the fact that client satisfaction, method acceptance and continuation depend on it (Koenig et al, 1997). The effectiveness, availability and convenience of contraceptive methods differ. The side effects users might experience and the resulting rates of discontinuation also differ according to method and characteristics of the user. It is thus important for family planning programme managers to understand the profiles of users of particular methods because method choice depends on these characteristics.

Method choice for a new user involves deciding to start using a contraceptive method and choosing a specific method. For current users, the choice is between continued use of the current method, switching to a different method or abandoning contraceptive use altogether (Ross et al, 2015). Method choice is also influenced by the knowledge a user has about a method, the experiences of other users/friends and their recommendation of the method. This improves initiation, satisfaction levels and continuation, but may also lead to discontinuations. High satisfaction levels of up to 91% have been reported for the injection, whereas users of combined pills report difficulties in compliance and method failure. In reality, there is no ideal contraceptive method and each method has both positive and negative attributes (Laryea et al, 2016).

A process called contraceptive career theorises that in their reproductive lifespans, most women will switch between two different contraceptive methods. The first methods to be initiated are generally condoms and/or pills, followed by the IUD and finally sterilisation. The contraceptive career varies in women due to personal characteristics and situations and is likely to influence decisions on contraceptive methods. When women use hormonal methods (which are more prone to side effects) for long periods, they most likely then switch to non-hormonal methods (Picavet et al, 2011).

Researchers have differentiated the terms "perfect use" and "typical use" in contraceptive use that impact on the effectiveness of some methods. For a method to effectively protect a user against pregnancy, a user must aim for the highest compliance or perfect use, which might involve strict user adherence for methods such as the pill. On the other hand, some women are typical users where compliance is lower and consequently rates of unintended pregnancies are more. LARC methods record very high effectiveness because they are not user dependent (Trussell, 2011).

Contraceptive use should ideally result into method satisfaction, no fear of pregnancy and convenience in correct use of the method. A comparison of the methods can be based on these good outcomes, while risks associated with use of the method are negative outcomes. Some very popular methods like the pill and condoms, sometimes give negative outcomes in terms of correct use and anxiety about unintended pregnancy. Long-acting methods mostly result in good outcomes. A comparison of positive against negative outcome results shows young contraceptive users reporting negative outcomes more than older users (Picavet et al, 2011).

Contraceptive users have different fertility intentions that make them choose specific methods. Younger women mostly use contraception to delay pregnancy, married or in union users will more likely be spacing children, while older women might be using contraception to prevent/limit births. Family planning programmes need to ensure users opt for methods that will help them meet their fertility intentions (Magadi and Curtis, 2003).

The fertility intentions of women are critical in method choice. Ideally, spacers will be inclined towards short-term methods, while limiters will go for highly effective, long-acting and permanent contraceptive methods. In some instances, however, women do not choose contraceptives that will help them attain their reproductive intentions. Service providers should counsel women who present for family planning counselling on suitable methods based on their individual reproductive goals (Skogsdal et al, 2018).

The need for contraceptives otherwise referred to as demand is intertwined with the supply of contraceptives. As demand from women users increase, so does the pressure for supplies on national programmes, donors and manufacturers. Demand for modern contraception has been increasing in most developing countries, including sub-Saharan Africa, but supply has not matched it. Globally, more than 200 million women remain in need of modern contraceptive methods and are contributing to more than 80% of unintended pregnancies. Meeting this demand may increase mCPR by 50% to 75%. Supply involves providing a variety of easily accessible and affordable safe and effective modern contraceptive methods from several options of service providers (IPPF, 2011).

Innovative ways of increasing demand have been advanced. Urban Reproductive Health Initiatives (URHI) in India, Kenya, Nigeria and Senegal tried using influential religious leaders to directly influence men to approve contraception and thus indirectly influence women to use contraception. The intervention worked very well in Kenya (Speizer et al, 2014).

On the critical question of whether the choice of a method is driven by supply or demand, it is important to establish whether women use the contraceptive methods they prefer, or those recommended by providers or are available at the nearest health facilities. Almost all potential users appear to have a premeditated choice on methods, and few altered their choices upon reaching a clinic. The availability of preconceived choices may thus influence contraceptive uptake more than the available range methods (Cornelius and Novak 1983; Chumnijarakij et al. 1981).

In agreement with this finding, the Kenya Service Provision Assessment Survey (KSPA), (1999) data suggested that choice of method in Kenya may essentially be driven by demand. Interviews with health workers pointed to them promoting or emphasizing some methods. During consultations with clients, results showed that all women spontaneously or when asked mentioned a preferred method, and most (88%) received their preferred method. The Kenya Health Service Delivery Indicator Survey 2018 report reinforces this factor, with family planning clients reporting 97% satisfaction on freedom of choice and services received and 99% satisfaction with family planning staff attitudes (NCPD, 2019).

Contraception is either for spacing or limiting births, with demand for spacing almost double that of limiting. Use of contraception to limit births has been shown to have a bigger impact in reducing fertility rates than contraception for spacing births. Normally, demand for spacing is more than demand for limiting in younger women. In older women who have mostly reached their desired number of children, the demand for limiting is more. Contraceptive users who are limiting are on average a decade older than those who are spacing (37 and 27 years old respectively). Fertility desires are mostly high in sub-Saharan Africa but demand to limit has also grown even in younger women. Analysis of several countries found demand to space births in all women of reproductive age was almost double that of limiting, while in married women, demand to limit almost equalled demand for spacing. Scholars have coined a term "demand crossover age", which refers to the average age when demand for limiting more births starts to exceed demand for spacing and it happens when contraceptive users attain their planned family size and want to stop births. In most sub-Saharan Africa countries, this happens around age 33 (Van Lith et al, 2013).

Murphy and Steele, (2000) outlined key factors that affect the appropriateness, efficiency and continuity of contraceptives. These factors included a variety of available contraceptive methods that addressed particular clients' preferences. They ensured the suitability of methods through involvement in counselling, screening for suitability and client education.

Studies on determinants of method choice have reported a strong positive association between contraceptive use and socio-economic status factors like wealth status and women's education. Contraceptive use has been shown to be higher among women with higher educational and wealth status. Use is higher in urban dwelling women than in the rural dwelling ones (Kimani et al, 2013). These factors influence the exposure, attitudes and behaviour of women towards contraceptive use.

In general, women of higher wealth status have been found to use contraception and even long-acting and permanent methods more than those of lower wealth status. Use of permanent methods has been associated with higher socio-economic status (Azmoude et al, 2017).

Among the identified critical determinants of contraceptive use are age and the socio-economic factors of education, residence (urban/rural) and wealth quintile. Magadi et al, (2001) reported consistent variations in contraceptive use dynamics based on urban and rural areas. They also noted a widening gap possibly resulting from non-use due to unmet need for contraception declining much faster in urban than in rural areas. They pointed out the need to address the increased disinterest in future use among non-users in urban areas and their health concerns.

Use of modern contraceptives has appeared always lower for women with no education compared to those with some education and the gap has been widening (NCPD, 2013). The variations in method choice by education raise questions on the role of the amount of knowledge women have when choosing the first method. Women with higher levels of education are more likely to have positive attitudes on contraception. This is because they possess more knowledge on contraceptive methods and use and most likely visit health facilities, hence are more inclined to initiate contraception. Education strongly mediates the effects of factors such as age, residence, wealth and region on contraceptive use, by giving women empowerment, which greatly influences the decisions they make on contraception (Sabates et al, 2011).

A 2011 study in Uganda found that female education, more so secondary and beyond, increased the likelihood of using contraception. This was attributed to the fact that when a woman stayed in school longer, they most likely delayed their first birth. They therefore had less time to give birth to many children, opting for smaller family sizes and to achieve this, they used contraception. More education comes with more exposure as women learn more about their bodies and use the information to make choices on family sizes. Autonomy, which comes with

more education, likely leads to later marriages and increased contraception use (Bbaale and Mpuga, 2011).

On the association between increase in the level of a woman's education and the increased use of contraception, more education influences women towards a lower demand for children. Consequently, this leads to more demand for contraception because a lot of time is spent in school and afterwards in employment, leaving little time for child rearing. Education was found to positively influence contraceptive use mostly through increased knowledge of and access to contraception. Women with more education were found more likely to be current contraceptive users than those with no education (Irani et al, 2012; Sabates et al, 2011).

A woman's education and age will most likely influence her towards certain methods. For example, use of injectable methods declines with increasing education levels. (Gomez and Clark, 2014, Magadi et al, 2001). However, other studies have yielded conflicting results on education (Ali and Cleland, 1999; Laing, 1985).

Age also has the biggest direct impact on contraceptive use but also indirect relationships with contraceptive use. Younger women were more likely to have some level of education and to approve of contraception (Sabates et al, 2011).

On wealth status, studies have found that women of lower quintiles are less likely to use modern methods of contraception. The gap in contraceptive uptake between women in lower quintiles and those of higher quintiles implies that poorer women have gained less from family planning programmes (NCPD, 2013; Clements and Madise, 2004). Wealth status of a household and the place of residence may indicate poverty in terms of assets and living conditions (Irani et al, 2012).

The number of children a couple have might also affect their choice and use of contraception. Pills are a common method among nulliparous (without children) women, while LARC are used more by multiparous (with more than one child) women (Lutalo et al, 2000, Ali and Cleland, 1995).

The approval of contraception by a partner is an important factor in the choice of a method. Women with partners who disapprove of contraception are more inclined to use traditional methods of contraception, implying the disapproval is towards modern contraception, not contraception in general (Magadi and Curtis, 2003; Magadi et al, 2001). Partner disapproval of contraceptives may drive women towards certain methods like injectables and away from some

methods, for example barrier methods (Haddad et al, 2013; Magadi et al, 2001). This finding is not consistent across studies.

Current method of contraception, its effectiveness, convenience, availability and side effects if any is another key factor in method choice. Some methods such as hormonal ones tend to have more issues with side effects than others. Others including the barrier methods are affected by issues of convenience (Birhane et al, 2015; Burke and Shisanya, 2014; Jones et al, 2012; Moreau et al, 2009). There is a general consensus on these issues across studies. However, a finding by Ersek (2011) that women who had used a non-coital dependent method were least likely to have discontinued their last method compared to women who had used a coital dependent method, broke the consensus on method effectiveness and convenience.

Community factors such as residence (urban/rural) and region also influence method choice. Choice of contraception among women of certain communities was likely to be correlated because of communities' perceptions on specific methods (Magadi et al, 2001; Lutalo et al, 2000). Also, the available range of methods at the health facilities influence method choice and hence continuation (NCPD, 2000). This is however not consistent across studies.

Changing method mix is one of the common features in the increased use of contraception reported in the majority of sub-Saharan Africa countries. The pill used to be the most popular modern contraceptive method but was overtaken by injection contraceptives. The injection's many advantages quickly made it the most used method at an average of 7% compared to the global average of 3.5%. The injection is associated with a variety of non-contraceptive benefits, like reducing risks of uterine fibroids, ectopic pregnancy, pelvic inflammatory disease, endometrial cancer and sickle cell anaemia. Epileptic users of Depo Provera have reported less seizures (Lande and Richey, 2006; Kaunitz, 2000).

Access to a wider method mix might be a major factor in method choice, but different levels of access are required to initiate choice of methods like pills and sterilization. For all methods, cost is important to the individual. Higher income will naturally facilitate use of more expensive methods (Magadi et al, 2001, Bulatao et al, 1989).

Method mix is key in contraceptive use and it has a great impact on fertility. The use of more effective methods by women and couples has been found to result in greater fertility declines than the use of less effective methods. On the other hand, lack of alternative methods can raise the rates of discontinuation and consequently the risks of unintended pregnancies by limiting users to fewer options when in need of switching. Increasing the range of methods has also

been found to result in increased use of modern contraception and it has been suggested that one additional method may increase overall contraceptive use by a considerable 12 percentage points (Prusty et al, 2018; Ross and Stover, 2013).

The effect of motivation cannot be underscored. Women who seek birth control have varying levels of motivation to avoid pregnancy through use of contraception. On that basis, they select to initiate different reversible hormonal methods of contraception (Raine et al, 2011; Ullah and Humble, 2006).

Concern about possible side effects of some methods appears to influence the choice for most methods. However, the side effects and other negative factors of a selected method sometimes appear less important, or are disregarded for complex reasons, for example in opting for the condom. In Brazil, female sterilization was the leading method in prevalence, with the rejection of hormonal contraception possibly influenced by the characteristics of service provision in the area. Women, including those in the never used category, reported concern about side effects of hormonal contraceptives and opted for sterilization (D'Antona et al, 2009).

When a method is chosen to address an identified contraceptive goal, its continuation or discontinuation is not only a reflection of the method's attributes, but also partly of the original goal (Jones et al. 1980; Bauman and Varavej 1972). Lower rates of continuation, and resultant higher fertility, may therefore point to a method being used as the clients intended.

Women's contraceptive preferences are connected to contraceptive features and affect continuation. Gomez and Clark, (2014) had an interesting finding that a frequent attraction of contraceptive features was that the method did not interfere with sexual pleasure. Women were attracted to contraceptives that "maximized sexual enjoyment however they defined it, while minimizing sexual discomfort and interruption." Thus, the influence of a method on sexual pleasure was perhaps an important consideration for a woman's contraceptive choice and continuation.

Among sexually transmitted disease populations, a key consideration was that methods are used for the dual purposes of preventing a pregnancy and prevention of sexually transmitted diseases (Ramstrom et al, 2002).

Analysis of choice of method in Kenya has revealed marked regional differentials with the probability of use of modern contraceptive methods. The use of long-term methods was generally higher in urban areas than in rural ones, while the probability of use of traditional methods was higher in rural settings than in urban ones. Less variation was evident in the

probability of selecting modern or traditional methods based on religious affiliation, educational attainment, ideal family size and recent experience of an unintended pregnancy or being exposed to mass media messages (Magadi and Curtis, 2003).

Couples have been found to be more likely to favour short-term methods over long-term or traditional methods of contraception. In addition, the probability of using short-term methods declines with age, while that of using long-acting and permanent methods increases with age (Tibaijuka et al, 2017).

Family planning service providers are supposed to inform potential clients about the side effects of all methods and how to counter them. This information would enable clients to make a rational choice about the method of contraception that may work best for them so that the likelihood of discontinuation reduces. KDHS 2014 findings showed that about 60% of current users of modern contraceptives were informed about possible side effects of their chosen method, while 52% were told how to handle side effects. Government facilities appeared well-placed to provide information on side effects, with 63% of users reporting having received information. In the private sector, 55% of users reported receiving such information (KNBS, 2015).

Kenya's Ministry of Health, in the latest National Family Planning Guidelines, identifies the critical factors in selecting a method as the reproductive needs of a woman/couple (spacing, timing, limiting), personal concerns such as travel costs, pain or discomfort that maybe experienced and the need to guard against STIs and HIV (MOH, 2016).

2.5 Determinants of Contraceptive Discontinuation

Consistent determinants of discontinuation include method used, side effects, age, parity, fertility intentions, quality of care and changes in marital status (Bekele et al, 2015; Rizvi and Irfan, 2012; Curtis and Blanc, 1997). On the other hand, discontinuation has been found to be less consistently associated with the number of methods available, socio-economic factors, residence, partner's disapproval, cost and accessibility of the method (Blanc et al, 1999; Ali and Cleland, 1999; Curtis and Blanc, 1997).

Contraceptive discontinuation is a common occurrence during the first 12 months after initiation of a method. Several studies based on DHS data show that reversible modern methods are associated with high rates of both discontinuation and pregnancy. Consequently, many women who have initiated use of a modern method will discontinue their use even when they

do not want to become pregnant (Bradley et al, 2011; Curtis et al, 2011; Ali, et al, 2012). Levels of discontinuation vary by countries; from 20% to 50% for women on modern reversible methods. Mostly, discontinuation is a result of reasons other than desire for a child, hence can be called premature (Ali et al, 2012).

Discontinuation is not necessarily negative. Some women may discontinue a certain method because of side effects, difficulty in use or inconvenience to the woman and her partner, but switch to more suitable or effective method (Castle and Askew, 2015). The high discontinuation rates are not considered as adverse, if the women who do not want to become pregnant switch to other methods (Harbison and Adetunji, 2009).

Not much is known about the methods that women switch to after stopping use of a particular method. Studies have suggested that after three months, about 60% of those who were on modern methods switched to other methods, while 26% were not on any method and 10% had become pregnant (Ross et al, 2015; Ali and Cleland, 2010).

Method selected has been found to be a significant predictor of discontinuation as cited in the discontinuation rates for various methods, especially hormonal ones. A consistent finding was that method continuation was higher with long-acting methods such as implants and IUDs, which do not depend on user behaviour. Women who used non-coital dependent methods were least likely to discontinue their last contraceptive method than women who used coital dependent methods (Raine et al, 2011; Ersek et al, 2011; Davidson et al, 1997). However, a contradictory finding by Frost et al (2007) found that women using coital-dependent methods were less likely to discontinue contraception.

Method characteristics have been shown to directly influence contraceptive discontinuation rates, by their influence on the risk of discontinuing a method and indirectly because they influence the choice of a method. Thus, whereas discontinuing the IUD calls for a proactive step to go for removal unlike the injectable or pills, women who show more likelihood to discontinue may also be less likely to initiate the IUD (Ali and Cleland, 1999; Curtis and Blanc, 1997).

Age is a critical factor in discontinuation, especially among adolescents and young women and association varies by method. Prevalence of marriage for this particular age group has fallen in most countries. The decline in several countries has come with increased sexual activity outside marriage and therefore increased contraceptive use. An unprecedented large cohort of young

people is entering childbearing ages and their reproductive behaviour will shape the increase as well as the size of the population of the world for several decades to come.

The age of a woman at the time of contraceptive discontinuation emerged as consistently associated with all three types of discontinuation. Older women were less likely to discontinue while in need, experience failure or switch methods than younger women. However, women's education had a negative association with abandonment while in need but had a positive association with switching (Ali et al, 2012; Bradley et al, 2009; Steele and Curtis, 2003).

Younger women exhibited much higher discontinuation rates than older women. Younger women were more likely to abandon contraception while still in need than older women (Danielle et al, 2013; Rocca et al, 2013; Raine et al, 2011). Very high rates of discontinuation (as much as 60% in six months) among under 25 have been recorded in some countries (Kamalifard et al, 2014). Ersek et al (2011), in a study of the association between contraceptive methods used, satisfaction levels and discontinuation in a university setting in the US, came up with a different finding – that women aged 25 or more were more likely to discontinue their last method in comparison to younger women. In general, older, in union and higher parity contraceptive users were less likely to discontinue, while being younger significantly increased the rate of discontinuation. Long-acting reversible contraception has the potential advantage for adolescent females to delay pregnancy for several years.

Contraceptive practice for adolescent women involves much experimentation and inconsistency in use. Higher levels of contraceptive failure and abandonment while in need of contraception were found in adolescents than in older females. Adolescent contraceptive use is prone to shorter periods of continuous use, more method failure and more discontinuation for varied reasons (Blanc et al, 2009). Women aged less than 25 years had higher contraceptive discontinuation rates than women aged 25 years or older (Castle and Askew, 2015; Rizvi and Irfan, 2012; Magadi et al, 2001)

Age and parity are mostly correlated and either factor may be an indication of the other. Smaller proportions of users with more living children will discontinue contraception compared to users with fewer living children. (Salhan and Tripathi, 2004). Women with lower parity had significantly lower duration of implant use than those of higher parity and terminal fertility control was the commonest reason for choosing the method. Women who used the method to limit their families significantly stayed longer than those using the method for child spacing (Birahne, 2014).

Even though socio-economic factors are crucial in influencing the type of discontinuation, a weak association between them and discontinuation is found in some studies. (Blanc et al 2002; Magadi et al 2001; Ali and Cleland 1999; Curtis and Blanc, 1997).

Most studies show results where education of the couple plays a key role in discontinuation. It is often assumed that more educated, higher status couples better exposed to communication messages for family planning with better access to health facilities will more likely practice, continue and use contraception more effectively. However, some studies have found that neither the education of a woman nor that of her partner influences the length of use of methods or has significant effect on discontinuation (Rizvi and Irfan, 2012; Ali and Cleland, 1999, NCPD 1986). Perhaps the couple's educational status was overshadowed by other more intriguing factors like desire to become pregnant, health concerns/side effects, cultural/ religious beliefs against contraceptive use and socio-economic factors. Laing (1985) found women with no education to have the highest continuation rates.

Odhiambo (1997), found continuation to be higher for women with primary level education and lower for women who had secondary education. This was probably due to higher use of the pill by women with secondary education, which has higher discontinuation rates or the fact that better educated women switch methods more. Kungu (2001), found similar results. Partner's education was also found to significantly influence contraception. Occupation has also proved important in contraceptive continuation where discontinuations have been found to be higher among non-workers than among workers (Onsongo, 1988).

Marital status is associated with discontinuation. Early and higher discontinuation rates have been observed among single, widowed, separated and divorced women, as they are less likely to be in stable relationships (Danielle et al, 2013).

Contraceptive discontinuation is linked with the quality of care, which is likely to affect contraceptive adoption and continuation. Lower discontinuation rates are an indicator of high-quality services, while high discontinuation rates imply poor quality care. Contraceptive discontinuation for quality related reasons (all reasons apart from those of reduced need for contraception) accounted for 25% to 60% of discontinuations (Castle and Askew, 2015; Birhane, 2014; Hubacher et al, 2012; Ali, 2001; Blanc et al, 1999). To promote continuation of contraceptive use, it is important to ensure the services provided are of high quality, because lower quality of services is closely linked to non-use and discontinuation of contraceptive methods (Blanc et al, 2002).

The attitude of health providers towards contraceptive methods in developing countries has also been shown to influence continuation rates among clients (Rizvi and Irfan, 2012). Lack of interpersonal communication and courtesy by providers' inconsistence or poor skills may contribute to poor understanding of potential side effects and incorrect method use (Huda and Chowdhury, 2014).

Ullah and Humble (2006) recommended service providers be given periodic refreshing of knowledge and skills to assist them provide updated and accurate information on dealing with side effects. Salhan and Triparthi (2004) also concluded that discontinuation rates may reduce when women are informed about the potential side effects of contraceptives while they are selecting a method. Rizvi and Irfan (2012) and O'Fallon and Speizer (2011) have also given credence to this conclusion.

RamaRao and Mohanam (2003), in The Gambia and Niger, found that women who reported that they did not receive proper counselling were more likely to discontinue. In The Gambia, 51% of those who felt inadequately counselled discontinued, compared with only 14% of those who felt adequately counselled. Similar findings were reported for China (Lei et al, 1996) and India (Patel et al, 1999).

Commodity stock outs may also be a reason for discontinuation, as Burke and Shisanya, (2011) concluded in a study of discontinuation among injectable contraceptive users. When injectable methods were not available at the family planning clinics, users discontinued the method, as they could not afford it elsewhere. A multi-country analysis of DHS data showed that 5% of discontinuation was due to commodity stock outs (Futures Institute, 2013), while Hubacher et al, (2012) noted that consistent use of hormonal methods in most African countries was threatened by commodity stock outs.

The range of methods available or method mix has a strong relationship with contraceptive prevalence. Jain (1989) demonstrated this while studying the effect of quality of family planning. He argued that access to a range of contraceptive methods was likely to influence continuity of use and thereby contraceptive prevalence.

Method mix is therefore crucial in reducing discontinuations. Jain et al, (2013) estimated that adding one additional method or its equivalent to the number of methods available, there was a six (6) to eight (8) percentage point lowering of contraceptive discontinuation. Broadening the choice is necessary to minimise discontinuations due to side effects (Castle and Askew, 2015; O'Fallon and Speizer, 2011). However, the situation of method mix in many countries

in sub-Saharan Africa is one of severe imbalance where one or two methods take more than half of all prevalence (Ross et al, 2015; Bertrand et al, 2014).

Contraceptive use has also been seen to be determined by the individual's perception of their religious standpoint (Birhane, 2014). Rizvi and Irfan, (2012) examined contraception among Muslims in Pakistan and found that religious beliefs and beliefs about health risks are mutually reinforcing on discontinuation. Shah et al, (2007) had previously found the probability of discontinuation to be higher in Bedouin and lower in non-Bedouin women, hence ethnicity of Kuwaiti women emerged as an important issue in discontinuation. Bedouin women also had a higher fertility desire than non-Bedouin women, hence lower motivation for contraceptive continuation and consequently higher discontinuation rates.

Motivation to prevent pregnancy was another crucial factor in discontinuation. Couples who do not want more children (limiters) are better contraceptive users than those who are spacing. For spacers, contraception is generally adopted after one or two children (Shah et al, 2007; Ali and Cleland, 1999). Another study by Curtis and Blanc, (1997) concurred and argued that users of modern methods were less likely to discontinue contraception to become pregnant if they were limiters but not spacers. On the other hand, desire for pregnancy is a leading reason for discontinuations at longer durations of use. After 24 months, the probability of abandoning contraception for this reason was between 11% and 23%, while at 12 months it ranged between 5% and 10% (Ali and Cleland, 1995).

The decision to continue or discontinue contraception involves factors like how acceptable contraceptive options are, current and future situation, and fertility desire. This was demonstrated by Curtis et al (2011) who analysed DHS data from six countries. They found that discontinuation was linked to low motivation to avoid pregnancy. Another finding was that discontinuation due to quality-related issues was more common than discontinuation brought about by reduced need for contraception (desire for pregnancy, marital dissolution and menopause). This was seen in the huge proportion of pregnancies following discontinuation being reported as intended.

Studies show variations in rates of discontinuation by method may point to user characteristics and the features of the method. Variations in rates of discontinuation by user characteristics may also indicate the choice of methods for the users. There may be possible connection between acceptance of a contraceptive method and its discontinuation rate. The use of the method could possibly influence a change of attitude in individual women towards

contraception. This interplay between acceptance of a method and discontinuation determines the overall contraceptive rate, which directly influences fertility outcomes (Magadi and Curtis, 2003).

Discontinuation is also influenced by attitude and behaviour. Young women's pregnancy intentions are often inconsistent with their contraceptive behaviours, as explained by the theory of ambivalence. Qualitative studies have revealed that although women are aware of the drawbacks of childbearing, they also perceive advantages. Raine et al, (2011) found 82% of pregnancies among adolescents and 64% among women aged 20–24 is unintended. Some 22% of study participants became pregnant during the study period, including 15% who became pregnant within six months of contraception. Young women who perceive benefits to having a child may engage in behaviours that put them at risk of pregnancy, even if they state that they do not want to become pregnant and they seek hormonal contraceptives. Other studies have supported this finding (Jain, 2014; Rocca et al, 2013; Upadhyay, 2012; Curtis et al, 2011; O'Fallon et al, 2008).

Source of contraceptive method was also found to be important in discontinuation by Zhang et al (2000). Contraceptive users getting services from private facilities and hospitals had higher continuation rates, while those obtaining services from the public facilities and commercial outlets had low levels. This may be explained by the better-quality services at private facilities and the variety in the method mix. Travel times shorter than one hour were found to significantly lower discontinuation, especially for those discontinuing for non-method related reasons.

Socio-cultural and behavioural factors may influence initiation and continuation of contraception (Zhang et al (2000). Magadi et al, (2001) found that decisions to discontinue contraception reflect a complicated social system in which multiple factors and issues are at play. Burke and Shisanya (2011) and Iyer and Weeks (2009) concur.

Urban versus rural residence and source of supply are strong correlates of method failure and discontinuation. This is probably attributable to differential exposure to family planning and possibility of access problems in rural areas (Rizvi and Irfan (2012). This finding was consistent with Amin et al, (1997) who found significant inter-district variation in the use of modern contraceptives. Women living in informal settlements have elsewhere been found more likely to be former than current users of contraception than those living in formal settlements and consequently they are more likely to discontinue contraception (Irani et al, 2012).

Steele et al, (1999) found higher discontinuation to be associated with a non-government source of contraception. The source was associated with higher discontinuation of the pill due to reasons associated with the method.

In Ghana, the period of use of contraceptive methods was much longer for urban women than for rural women (Parr, 2003). Residence and wealth status were also significant factors in discontinuation, with rural communities being twice more likely to discontinue than urban communities (Mahumud et al, 2015). This might be an indication of the smaller family sizes that urban parents aspire to have. Hameed et al, (2015) also found an association between IUD discontinuation and geographic location or place of residence.

Access to services as a determinant of discontinuation has shown mixed results. De Graff et al (1997) and Hotchkiss et al, (1995) showed support for its role in discontinuation, while Akin and Rous (1997) failed to show any effect on discontinuation.

Mass media was also found to impact on contraceptive behaviour by Omwanda, (1986). Greater media exposure reduced the likelihood of a woman being in a low contraceptive status. It also increased the probability that higher proportions of women would be in higher contraceptive status. Ideational factors also had a similar effect as Babalola et al (2015) and Laing, (1985) found.

HIV status may also be a factor in discontinuation. A study of HIV positive women in Kenya found the major reason given for change of methods or discontinuation of a method was physical side effects. Other reasons given for discontinuation were fertility desire (prior to HIV diagnosis), dissolved relationships brought about by death or elective separation, and inconvenience of contraceptive methods (Imbuki et al, 2010). They found that HIV status increased support for contraception, with many study participants expressing their intention to use, switch or discontinue the method due to HIV diagnosis. This factor was influenced by the side effects experienced by HIV positive colleagues from the method, with most participants reporting negative side effects from all methods. HIV status also made women more assertive on the use of contraceptives, especially condoms. Male partners were also strongly linked to contraceptive choice and continuity. Haddad et al (2013) concurred.

The tendency for young women and their sexual partners to use condoms then abandon their use once they adopted hormonal contraception placed them at high risk of STI/HIV infection. Sangi-Haghpeykar et al (2005) examined dual protection against pregnancy and STI/HIV infections among users of hormonal contraception. They found that 54% of those who were

using consistently at baseline had discontinued or reduced use of condoms since adopting hormonal contraception. The highest consistency in use of condoms was associated with younger, not married women whose male partners approved of contraception.

Experience of unplanned pregnancy and abortion often does not bring motivation to protect against another unplanned pregnancy. Contraceptive discontinuation was higher among women who had had an abortion or those who were not very sure of continuing their method for one year at initiation. Women who had gone through an abortion at the time of the study were found more likely to discontinue contraception than those who never undertook an abortion. Those who had recently or previously aborted were also 60% more likely to have become pregnant (Upadhyay, 2012).

It is important to reduce unmet need to discourage contraceptive discontinuation. In developing countries, up to 20% of unmet need results from discontinuation because of side effects (Ali and Cleland, 1995). In Nepal for example, 25% of women with unmet need for contraception discontinued contraception due to side effects. In Ghana, about 50% of women who discontinued contraception became pregnant in 32 months, where one-third of the pregnancies were unplanned and 39% were aborted. Jain (2014) attributes a total contribution of contraceptive discontinuation to unmet need as 94 million clients. Jain argues that reducing unmet need may help FP2020 reach its target of 120 million women with contraception by 2020. He equates discontinuation to a "leaking bucket" of current contraceptive users, which empties them into another bucket of past and never users whose combination makes up unmet need. This theory implies that the bucket of current users can never get full or even rise substantially.

Castle and Askew, (2015), in an FP2020 review, have summarized all these factors into three key determinants of discontinuation: health systems elements (commodities, human resources, policy environment, and multiple delivery points), service quality (comprehensive counselling, courteous staff, and engagement of male partners) and socio-cultural factors (understanding of side effects, intention, and motivation).

2.6 Summary of Literature Review

In contraceptive use dynamics, studies have showed method choice to influence contraceptive initiation, continuation and user satisfaction, and therefore is central to quality of care.

Reviewed literature has advanced that using more effective contraception especially long-acting and permanent non-user dependent contraceptive methods is the best way of assisting

women to achieve their reproductive intentions. Family planning programmes should therefore aim to provide a good method mix for women to choose from, depending on their need.

Use of LARCs has been advanced as a way of fast-tracking achievement of FP2020 targets, as LARCs give more convenience, higher user satisfaction and record lower discontinuation rates than other modern methods. They are critical in addressing high rates of unintended pregnancies, unmet need for family planning and for generally improving the service delivery aspect of family planning programmes.

From this review of literature, socio-economic and demographic characteristics are seen to be of major influence in method choice. However, these characteristics have varying effects as they may point to more than one underlying factor. A World Health Organization (WHO) task force in 1980 found that differentials in choice based on sociodemographic factors can be eliminated by equalizing information and access (Bulatao et al, 1989).

Rights-based family planning proposed by the International Conference on Population and Development (ICPD) in 1994 is about availing accurate, unbiased information about contraceptive methods to potential users to guide their choice of a suitable method. In many cases however, girls and women give birth to more children than they have planned and when they had not intended to because they have no access to contraceptive information and commodities. Even when they can choose a method, lack of knowledge about potential side effects and how to counter them may make a good number of needy users discontinue contraception and expose themselves to the risk of unintended pregnancy.

2.7 Conceptual Framework

Studies on contraceptive discontinuation all over the world and in Kenya have identified major factors that affect method choice and consequently contraceptive continuation.

The hypothesized scenario of relationships shown next is a combined framework for method choice and discontinuation. A complex interplay of factors involved in method choice and use include social, cultural, legal, political issues and supply factors involving the quality of services and readiness of care.

Client outcome is the acceptance and choice of a specific method. Factors related to the method of contraception are very important and are the current method of contraception, side effects if any, convenience, efficacy and availability.

These factors influence the woman directly or indirectly in her choice of contraceptive method, which then affects her motivation either to continue or discontinue contraception, hence their choice as the explanatory variables. Eventually, the method chosen determines continuity/non-continuity (discontinuation), contraceptive prevalence and thus fertility.

Figure 2.1 Framework for Discontinuation

Sources: RamaRao and Mohanam, 2003; Blanc et al, 2002; Jain, 1989
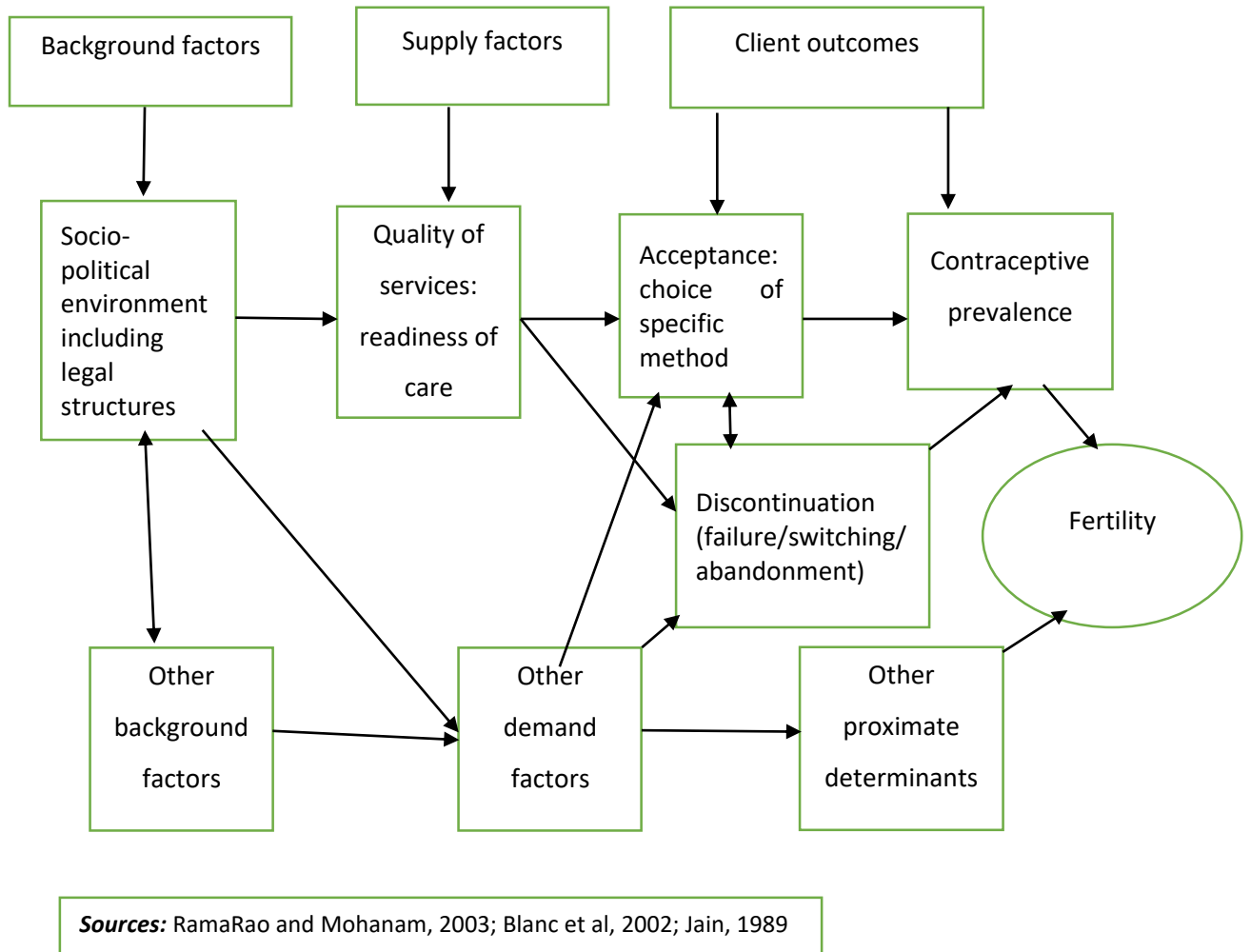
2.8 Definition of Concepts

Background factors: These are prevailing factors in the landscape of contraceptive use from the society, political, environment, legal arena etc.

Supply factors: Refer mainly to factors to do with where and how contraceptive service is provided.

Client outcomes: The end results of a client making a decision to initiate and continue with a contraceptive method.

Demand factors: These refer to the established need to delay, space or limit births in women of reproductive age.

34

Proximate determinants: These are biological and behavioral factors through which the socio-economic environment works to directly influence fertility.

Quality of services: These include issues to with technical competence of service providers, choice of methods, information given to potential clients, interpersonal relationships during the services etc.

Contraceptive prevalence: This is the percentage of women of reproductive age who are currently using, or whose sexual partners are currently using, a method of contraception, whether modern or traditional. It is usually reported for women aged 15 to 49 who are married or living with partners.

2.9 Operational Framework

The framework shows the background factors of the individual woman, her household characteristics, community factors and her current method of contraception interacting to influence the choice of method, which subsequently determines continuation or discontinuation of the method. Method choice and discontinuation represent the client outcomes of initiating and continuing or discontinuing use of a contraceptive method. There is no data on supply factors or quality of services in the KDHS, hence it is not possible to assess these factors.

Figure 2.2 Operational Framework
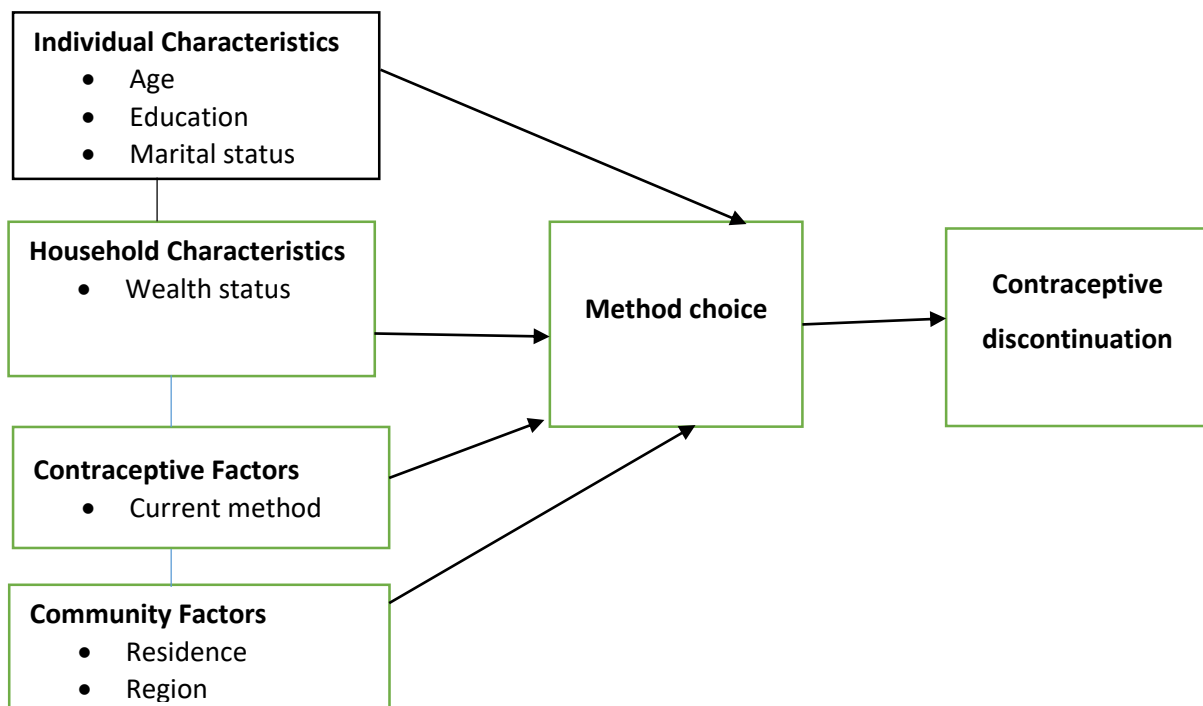
3 Definition of Variables

Dependent variables

Contraceptive method choice: This is the process by which individuals decide to adopt or not adopt a method.

Contraceptive discontinuation: The act of starting use of a contraceptive method/device then terminating use within the first 12 months after initiation while still not intending to get pregnant.

Independent variables

Individual level (women) variables

Age: Age of the woman in completed years 15-49 years, categorised in ten-year groups.

Education: The highest level of education a woman has reached in categories of none, primary and secondary.

Household level variables

Wealth: The wealth status of the woman in categories of low, middle and high.

Contraceptive variables

Contraceptive method: Current method of contraception the woman is using e.g. implant.

Community level variables

Residence: Whether the woman lives in an urban or rural area.

Region: The type of region where a woman lives categorised as high or low contraceptive use region. Regions of high contraceptive use include Nairobi, Eastern and Central, while low contraceptive use regions refer to Western, Nyanza, Coast, Rift Valley and North Eastern regions.

4 Operational Hypotheses

i   A woman's age has an effect on her contraceptive choice. Older women are more likely to use a modern method than younger women.

ii A woman's education has an effect on her contraceptive choice. Women with more education are more likely to use a modern method than those with less education.

iii A woman's wealth status has an effect on her contraceptive choice. Women with higher levels of household wealth are more likely to use a modern method than those of lower levels of household wealth.

iv A woman's place of residence has an effect on her contraceptive choice. Women living in urban areas are more likely to use a modern method than women living in the rural areas.

v   A woman's type of region has a great influence on her contraceptive choice. Women living in high contraceptive use regions are more inclined to choose a modern method than women living in regions of low contraceptive use because of diffusion.

vi   A woman's current method has an effect on continuation/discontinuation.

CHAPTER 3

METHODOLOGY

3.1 Introduction

This chapter details the data used in the study, where it was obtained from and the type of analysis conducted to address the different research questions investigated. The results obtained would provide a basis upon which inferences would be made. For accuracy on the sample population and better representation of a larger population, all data was weighted before analysis to conform to the DHS weighting system for individual women data, where weighting is given by v005/1000000. The Statistical Package for Social Sciences (SPSS) version 22 software was used in the conduct of various levels of analyses.

3.2 Data Sources

This study was based on secondary data analysis. Data was obtained from the Kenya Demographic and Health Surveys (KDHS) datasets of 2003, 2008/2009 and 2014, which were all national surveys. Of critical use was the detailed contraceptive calendar, which is a collection of a monthly record of fertility and contraceptive (non)use for the five years prior to the date of interview. The calendar also has a record of the main reason a woman discontinued a method and a marriage history which could be linked during analysis. Preliminary and subsequent analysis were to establish the trends in method choice and determinants of method choice using the three KDHS data sets of 2003, 2008/2009 and 2014, while the final analysis on determinants of discontinuation used KDHS 2014 data only.

3.3 Data Sample

In KDHS 2003, 8195 women of reproductive age were interviewed and 39% were found to be using contraception and 32% were using a modern method. In KDHS 2008/2009, 8444 women of reproductive age were interviewed. Some 46% were found to be using contraception, while 39% were using modern methods. KDHS 2014 involved interviewing 31079 women of reproductive age, among who 58% were using contraception and 53% were using modern methods. The KDHS files used were the individual women's files.

In the first stage of analysis to establish the trends in use of contraception, all the women using modern methods were included to establish the specific methods individual women were using. This aimed to give a background to the analysis on the major modern methods. In the subsequent analysis, the sample was narrowed to major modern methods – condom, pill,

injection, IUD, female sterilization and implants. The numbers in the sample were 1853 (2003), 2197 (2008/2009) and 10979 (2014).

It was not possible to do a trend analysis for discontinuation from 2003-2014 as was done for the method choice because KDHS 2008/09 had missing data for reasons of discontinuation. This data was crucial in establishing the determinants of discontinuation. Another study on discontinuation that analysed 2003-2014 KDHS data was confronted by the same challenge and has documented it (Ontiri et al, 2020). Data for the final analysis of discontinuation was thus obtained from KDHS 2014 only, where 18549 women were found to have been currently using contraception and 31% were found to have discontinued contraception for various reasons. From the group that had discontinued, a final sample not based on women but episodes of contraceptive use which terminated in the last 36 months for various reasons was created to form the core of the study on determinants of discontinuation.

3.4 Data Quality

KDHS data is of high quality based on the processes of household sampling, selection of respondents and conduct of interviews. Highly trained personnel handle data entry and analysis. Quality checks are done during the data collection and analysis.

However, contraceptive history data can be subject to recall bias to a small extent because reporting is retrospective, and accuracy depends on the good memory of the respondent. For the contraceptive calendar, the issue of poor recall can result into heaping of contraceptive events on rounded off or prominent months such as 3, 6, 12 and 24. However, Curtis and Blanc, (1997) concluded that such heaping was not major and could not affect discontinuation estimates significantly. Their other finding was that contraceptive prevalence estimates collected through the calendar matched those of current data collected at the same time-periods. An assessment of the calendar data from the three data sets used in this study did not show any evidence of heaping or inconsistency.

Another issue of concern is the risk of concealing contraceptive failure by stating the reason for discontinuation as wanted pregnancy. Misclassifying such unintended pregnancies might result in a bias of lowering estimates of contraceptive failure rates. Similar bias could result from underreporting of unintended pregnancies in cases of aborted pregnancies. However, studies have found minimal such bias in aggregate reports of contraceptive events. The studies have concluded that contraceptive calendar data is highly accurate, complete and more

consistent internally than data from the earlier approach of structured questionnaires (Strickler et al, 1997).

Another concern is that DHS allows for recording of only one (main) reason for discontinuation in the contraceptive calendar, which may not capture the whole picture of how women and couples make the decision to discontinue contraception. Reasons for discontinuation may not be mutually exclusive and the level of motivation for a woman to avoid a pregnancy might play a key role, especially in method failure (Curtis and Blanc, 1997; Ali and Cleland, 1995).

In the analysis on discontinuation, the unit of analysis was the episodes of contraceptive use. It had the advantage of reducing heaping, as the contraceptive users are not asked directly about the duration of contraceptive use (which can bring about heaping of data) but about use in each month.

3.5 Dummy Variables and Variable Recoding

The variables used in the study were in four levels: Contraceptive (method used), Individual/woman (age, education, marital status), Community (residence, region) and household (wealth). The categorical variables selected for analysis in the study were nominal or ordinal in nature and could not be entered into the multinomial logistic and Cox proportional-hazards regression models directly. As such, dummy (new) variables representing each category in a variable were created using the create dummy variables option in SPSS Version 22. Dummy coding was then carried out where values (0, 1, 2...etc.) were entered for each of the dummy variables and labels (names) were given to represent each category of the selected variables.

For ease of analysis, some variables of interest were recoded into fewer and more appropriate categories away from the KDHS coding. Age, coded as V013 in KDHS was recoded from seven five-year groups into ten-year ones to form three (3) groups of 15-24, 25-34 and 35-49. Education (V106) with four (4) KDHS categories was classified into categories of None, Primary and Secondary+ (secondary plus higher). Region (V024), which in KDHS represented each of the eight provinces before 2013 was coded as two groups of high contraception comprising Nairobi, Eastern and Central and low contraception representing the rest of the regions based on the 2003 KDHS. Nairobi, Eastern and Central had contraceptive use of over 50%, while prevalence in the rest of the regions ranged from 0.2% for North Eastern to 34.4% for Rift Valley. Consequently, from about 2006, efforts to scale-up family planning were mainly focused on five regions (Western, Nyanza, Coast, Rift Valley and North Eastern) whose

contraceptive prevalence was lower compared with the three whose CPR was very high. The classification in the study was therefore to highlight the uptake of modern contraception in these low contraceptive regions following the sustained interventions. Wealth (V190) status categories were recoded from five quintiles into three categories of lower (combining lowest and low), middle (middle) and higher (combining high and highest). Marital status represented by V501 was recoded from six KDHS categories into two categories of married/living together and not married/not living together. Residence (V025) retained the two KDHS codes of Urban and Rural.

For the cross-tabulation and multinomial logistic regression, variable V312 which comprises 17 categories of all the current contraceptive methods in KDHS data set was recoded as MethodCh, with three categories of interest being permanent methods (female/male sterilization), short-term (condom, pill, injection) and long-term (IUD, implants). The categories of not using and other methods were combined into one code and excluded from the analysis as the focus of the study was the major modern methods.

3.6 Creating the Discontinuation Variables

In the Cox proportional-hazards regression analysis, contraceptive methods of interest were pill, injection, IUD and implants and they were analysed individually so as to highlight the rates of discontinuation for individual methods. The social economic variables remained as coded for the multinomial regression but a lot of recoding was done for the many other variables from the calendar data used in the discontinuation analysis and several new variables were created.

Contraceptive methods were converted to numeric codes, using the position in the string and cases missing a code for contraceptive method were converted to '99'. They were denoted by a variable, method disc with categories 1-4 for pill, IUD, injection and implant respectively. Permanent methods (female/male sterilization) were excluded, as they cannot be discontinued. The method variables and codes were then labeled. Other variables were created from deriving or combining information from the calendar or the variables in the calendar. The list of these variables is given in Appendix 4.

Duration of use variables were created by looping through the calendar and creating separate variables for each month of the calendar. The month-by-month variables were then restructured into a long format where the month became the unit of analysis. Age in months was calculated for each month in the calendar. A century month code (CMC) for each month was then

calculated. This was derived from multiplying the difference between the year of an event (KDHS interview) and a year used as DHS reference period (1900) by 12 and then adding the month of the interview. CMC = (2014-1900) * 12 + month: An example is the CMC for an interview done in June 2014 would be: CMC = (2014-1900) * 12 + 6 = 120, meaning 120 months have passed between January 1900 and June 2014. The process involved finding the position of the earliest date of interview then aggregating the episodes within each case, keeping the start and end of each episode, the code, and other useful information. Any blank episodes after the date of interview were dropped. The event string variable for the episode was then converted to a numeric variable.

KDHS has 15 discontinuation codes for reasons of discontinuation as outlined: 1 "Became pregnant while using", 2 "Wanted to become pregnant", 3 "Husband disapproved", 4 "Side effect", 5 "Health concerns", 6 "Access/availability", 7 "Wanted more effective method", 8 "Inconvenient to use", 9 "Infrequent sex", 10 "Cost", 11 "Up to God", 12 "Difficult to get PG/Menopausal", 13 "Marital dissolution/separation", 14 "Other", 15 "DK", 96 "Other", 98 "Don't know" and 99 "Missing". To better categorise and analyse the variable, the reasons for discontinuation coded in the calendar were recoded into a variable labeled discontinuation code (typedisc); switching (1=7,8), discontinuation while in need (2=3,4,5,6,10,11) and other representing discontinuation no longer in need and failure/pregnancy (3=1,2,9,12,13,14,15). Reasons for discontinuation were converted to numeric codes using the position in the string, while the special codes for other, "Don't know" and "Missing" were coded as '96', '98' and '99' respectively and cleaned/deleted. The reason variables and codes were then labeled.

The P-Values and Confidence Intervals

The P-value is used in hypothesis tests to determine statistical significance. It refers to the calculated probability or the probability of finding the observed, or other extreme results when the null hypothesis (H_0) of the study is true. P values are used to evaluate how well the data sample supports the view that the null hypothesis is true, that is to measure the compatibility of the study data with the null hypothesis. In testing the hypothesis statistically, the p-value is the probability that in a statistical model, the statistical summary (for example, the sample mean difference between two categories under comparison) is greater than or equal to the exact observed results when the null hypothesis is true. High P values mean the data are likely with a true null while low P values mean the data are unlikely with a true null. A highly recommended cut off for statistical significance is 5% (Andrade, 2019). In view of this, the P-value in this study was set at .05.

Confidence levels/intervals are key in ensuring a good statistical model and are closely related with P-values. If the significance level in a study is 0.05, the set confidence level is 95%. When the P value is less than the significance (alpha) level, it means the hypothesis test is significant but if the P value is less than the alpha, the confidence interval does not contain the value of the null hypothesis, i.e. the hypothesis test is not significant. The confidence level represents in theory, the ability of the study analysis to produce accurate intervals when one can assess several *intervals* and the value of the population parameter is known. In a set confidence interval in a study, the interval may or may not contain the population value because there is no provision for probabilities apart from 0 or 1 (Neyman, 2001).

The confidence level represents in theory the ability of the study analysis to produce accurate intervals when one can assess several *intervals* and the value of the population parameter is known. In a set confidence interval in a study, the interval may or may not contain the population value because there is no provision for probabilities apart from 0 or 1.

Confidence intervals are the best estimates of population parameters because they produce intervals that contain the parameter. They comprise of the point estimate or most likely value and the margin of error around the point estimate. The margin of error gives an indication of the level of uncertainty surrounding the sample estimate in the population parameter. In view of this, confidence intervals help assess the precision of the sample estimate. The narrower the confidence interval, the more precise the estimate of the population parameter. The confidence level in this study was 95%.

Null Hypothesis

The 'null' hypothesis refers to the most common view of an issue, while the alternative hypothesis is about the view of the researcher on the cause of a phenomenon. The null hypothesis normally states that an independent variable has 'no effect' or 'no difference' on the response variable and is symbolized as H_0, while the alternative hypothesis is written as H_1. Study conclusions are always hinged on the null where based on the study results. A researcher either rejects or fails to reject the null hypothesis based on the p-value statistic. Failure to reject a null hypothesis implies that the confidence interval has a value of "no difference". A decision to reject the null hypothesis is made after comparing the p-value to α. If $p < \alpha$, the null hypothesis is rejected. In this study, the null hypotheses were that age, education, type of residence, wealth, type of contraceptive region and marital status had no effect on the choice of contraceptive method. The other null hypothesis was that the contraceptive method chosen had no effect on its continuation/discontinuation.

Alternative Hypothesis

An alternative hypothesis (H_1) is one where the researcher anticipates an effect between two or more variables, meaning that the observed pattern of the data is not a chance occurrence but a demonstration of statistical significance between the two variables. The alternative hypothesis is normally the one the researcher is trying to prove (believes to be true). It enables a researcher to discover new theories that can show that the existing theory may not be supported by evidence. If the null hypothesis is rejected, the assumption is made that there is considerable evidence in support of the alternative hypothesis. The alternative hypotheses in the study were that age, education, type of residence, wealth, type of contraceptive, region and marital status had an effect on the choice of contraceptive method. The other alternative hypothesis was that the contraceptive method chosen had an effect on its continuation/discontinuation.

3.7 Data Analysis – Method Choice

The data analysis was in two main parts: the first part involved the analysis of method choice where users of contraception were profiled through cross-classification analysis. Another level of analysis was done where the current method of choice was analysed against the socio-demographic variables of interest in the study to identify determinants of contraceptive method choice.

Cross-classification analysis refers to classification according to more than one attribute at the same time or the process of arranging into classes or categories of method choice. Cross-classification procedures measure the changes in one variable (use of contraception) when other variables (e.g. education) are accounted for. Contraceptive users were thus cross-classified on five characteristics of age, education, residence (urban/rural), region and wealth status. Cross-classification resembles multiple regression techniques and is essentially non-parametric, since no account is taken of the distribution of the individual values. Cross-classification was used to generate frequencies and percentage for each variable against the dependent variable. The Pearson Chi-Square statistic was incorporated to analyse any significant differences between expected and observed frequencies for each category in contraceptive use and non-use, independence, goodness of fit, and homogeneity.

3.8 Multinomial Logistic Regression

The second step in the analysis was to establish the determinants of contraceptive method choice. Multinomial regression is like an extension of binomial logistic regression and is

normally used to examine the influence of one or more independent variables on a nominal dependent variable with more than two categories. Like other models of regression, multinomial regression can include nominal and continuous independent variables. It can also predict interactions between independent variables and the dependent variable. The independent variables may be dichotomous or continuous.

An attractive feature of the model is that it does not encourage linearity, normality or homoscedasticity. The model has the maximum likelihood feature for estimation of the regression coefficients. Maximum likelihood feature is a process of constructing a likelihood function to show that the probability of the observations in the data are a function of unknown parameters. The coefficients that make the observed results 'most likely' are selected. To give an example, when the estimated probability of an event is less than 0.5, the prediction is that the event would not occur, but if the probability is greater than 0.5, the event would occur. The obtained logistic coefficients represent the level of change in the logit for a unit of change in the predictor variable.

Multinomial logistic regression or simply multinomial regression, which is a predictive analysis, was conducted because the dependent variable (method choice) was nominal/had more than two levels. It was used to predict the relationship between method choice and the socio-demographic (independent) variables of education, age, residence, wealth status, region and, marital status.

The multinomial logistic regression equation is written as:

$$\text{logit}(\pi_{ij}) = \sum_{k=0}^{K} x_{ik}\beta_{kj} \ , i = 1, 2, 3, \dots, N; \ j = 2, 3, 4, \dots, J; \ x_{i0} = 1 \quad (1)$$

The log odds are presented as:

$$\log\left(\frac{\pi_{ij}}{\pi_{i1}}\right) = \sum_{k=0}^{K} x_{ik}\beta_{kj} \quad (2)$$

If equation (2) above is transformed backwards, the probability in the response for the jth category would be:

$$\pi_{ij} = \frac{\exp\left(\sum_{k=0}^{K} x_{ik}\beta_{kj}\right)}{1 + \sum_{2}^{J}\exp\left(\sum_{k=0}^{K} x_{ik}\beta_{kj}\right)} \quad (3)$$

While in the baseline/comparison category it would be:

$$\pi_{i1} = \frac{1}{1 + \sum_{2}^{J} \exp\left(\sum_{k=0}^{K} x_{ik}\beta_{kj}\right)} \tag{4}$$

In establishing factors that determine contraceptive method choice, an emerging issue was the cause and effect action whereby an independent variable can affect the choice of a contraceptive method. On the other hand, the choice of method influences the variable. Another issue is where two different background variables influence each other (multicollinearity) which can affect the results if they are analysed together. In the analysis on determinants of method choice, care was taken to isolate variables and control for such relationships by first conducting bivariate analysis for each of the independent variables against the response variable and conducting simple correlations among the independent variables.

3.9 Data Analysis - Discontinuation

This stage of analysis examined determinants of duration of contraceptive use episode applying the event history analysis approach on the 2014 KDHS dataset. The unit of analysis in the study was the episode of modern contraceptive use, which refers to a period of continuous use of a contraceptive method in months. For this study, episodes that were sampled were those that ended in the 36 months before the survey. The reason for selecting episodes that terminated in the last 36 months is because an episode must end for its duration to be determined. Duration was the dependent variable in the study. The episodes of use could have started any time within the time covered by the contraceptive calendar (up to 60 months before date of survey) but had to have ended in the last 36 months.

Episodes from women who had not used modern contraceptives within the period covered by the contraceptive calendar were excluded from the analysis. Women who had undergone or whose husbands had undergone sterilization were also excluded, as the method is mostly irreversible hence they could not discontinue use. The study therefore used only episodes of use of the following modern contraceptive methods, namely, pill, IUD, injection or implants that started within the calendar period and terminated within the last 36 months before the survey date.

The data used for the study was the individual women's files from the 2014 KDHS data, which is presented in a format that puts individual women aged between 15-49 years as the unit of analysis. It had 31079 individual cases of women in the reproductive age group of 15 to 49 years. Cases of any ever use of modern methods in the five years before the survey were included to have a larger sample as opposed to having only current users.

One woman may be represented by several episodes of contraceptive use in the contraceptive calendar. For the discontinuation study, the women's files had to be converted into episode files, an events-based contraceptive dataset where each episode of contraceptive use was represented by one observation or case. The number of episodes of use of modern contraceptive methods (pill, IUD, implants and injections) which terminated in the last five (5) years were 6102 cases, while the number of episodes in the last five (5) years terminating within the last 36 months were 3355 cases.

3.10 Converting Individual Women's Files into Episode Files

Converting individual women's files to episode files started with the creation of separate variables for each month of the calendar by looping through the calendar variables to create separate variables. After that, the new month-by-month variables were restructured into a long format where the month became the unit of analysis, with only the needed variables retained and the unnecessary ones dropped. The cases of discontinuations retained were only where reason for discontinuation was not blank for the whole duration in the five years prior to the survey. The contraceptive methods and reasons for discontinuation were then converted into numeric codes. This was done using the position in the string, and then months of continuous use for the same woman were aggregated into single episodes of use for different methods. Care was taken to retain the start date, end date and code for each episode. Labelling was done for the method variables and codes as well as for the reason variables and codes i.e. discontinuation code. A century month code (CMC) variable was then created as explained in section 3.6.

3.11 The Contraceptive Calendar

The contraceptive calendar in the DHS survey questionnaire contains two columns:

    i   Births, pregnancies, terminations and contraceptive use.
    ii Reasons for discontinuation of contraceptive use.

The calendar period varies from respondent to respondent, depending on the date of interview. It normally covers five years preceding the interview, then the months from the start of the survey to the date of interview - normally about 63 months. The calendar in KDHS 2014 required contraceptive information from about May 2009 to around July 2014, depending on the month of interview as the survey ran from May to July 2014. The contraceptive calendar is attached as Appendix 3.

3.12 Methods of Analysis for Discontinuation

Two methods were employed in the analysis on discontinuation. These were life tables for the descriptive analysis on the episodes of use and reasons for discontinuation, and Cox proportional-hazards regression. The combination of life tables with Cox proportional-hazards methods of analysis are used effectively in most discontinuation studies (Hameed et al, 2015; Kamalifard et al, 2014; Puri et al, 2014; Megha et al, 2014; Rocca et al, 2013; Raine et al, 2011)

3.13 Life Tables

Life tables are an indirect method of estimating mortality where registration of deaths is not reliable. The concept of a life table is to follow a group of people from a starting point until they experience the next event. It represents the life history of a cohort as it is diminished gradually by deaths (in this case discontinuation). It is based on the reason that a woman who is using contraception is faced with the risk of discontinuing month after month. Life table analysis is able to factor right censoring i.e. episodes of use that were still in progress at the end of the survey. The simultaneous consideration of multiple reasons for discontinuation can be computed from this method. Life table analysis is good for retrospective studies, which take the approach of event history analysis (Cox, 1972). Analysis of contraceptive discontinuation is done through multiple decrement life tables (MDLT).

Life tables have basic assumptions adopted in the analysis on discontinuation.

i   The cohort (contraceptive users) is closed to migration and changes to the membership occur only through death (discontinuation).

ii Members of the cohort die (discontinue) at each age according to a fixed schedule which does not change.

iii The cohort starts from a standard number of births (acceptors of contraception) set at a round figure e.g. 1000, 10,000 or 100,000 and referred to as the radix.

iv Deaths (discontinuations) are evenly distributed at each age.

v   The cohort contains numbers of one sex (women).

The life table functions that were applied to this study were:

- *l_0 (radix) - total no. of women who were using contraception from May 2009 to May 2014*

- *l_x - no. of women still using contraception at exact month x*

- *nq_x - proportion of episodes of discontinuation at month x+1*

3.14 Cox Proportional-Hazards Regression

Cox proportional-hazards regression is a procedure for the analysis of "survival data" i.e. data that measure the time until a certain event occurs. It defines the risk of instantaneous occurrence of a given event, in this context, the time until a contraceptive discontinuation occurs. A "failure" is said to occur when the event takes place. The proportional hazards model was developed by Cox in 1972 (Cox, 1972), but has been modified by other scholars over time. It assumes that there is a hazard (risk) at each duration, d, of the occurrence of the endpoint event and assumes the hazard function is proportional to an unspecified baseline hazard but is influenced by a vector of explanatory variables. It allows the risk to depend upon personal characteristics such that for an individual 1 with a known set of characteristics represented by a vector of covariates Z_i the hazard (risk) function $U_i(d)$ is given by;

$$U_i(d) = e^{\lambda(d)} e^{\beta Z_i}$$

β is a vector of parameters and the hazard function is a product of underlying duration dependent risk $e^{\lambda(d)}$ and another factor $e^{\beta Z_i}$ that depends on covariates. The factor $e^{\beta Z_i}$ is the relative risk associated with having the characteristics Z_j. When a variable has n categories, n-1 covariates (and parameters) must be included in the model. For example, if wealth has three categories (lower, middle, higher) two covariates are necessary with the other being the dependent variable.

Cox proportional hazards model has two attractive features. First, it is a multivariate procedure such that the impact of one variable e.g. desire for more children on discontinuation can be ascertained while other variables e.g. respondents' education, age etc. are held constant. Second, it allows for handling of censored data. In this study, this applies to those respondents whose episodes of contraceptive use were still continuing at the time of the interview. Excluding these respondents would mean excluding a vast amount of information, thus resulting in small sample sizes and large standard errors.

3.15 Interpreting the Cox Regression Parameters

The regression coefficients B_1 in the Cox model provide information on the relationships between the predictor variables and the independent variables. The key parameter is the Hazard Ratio, which is a measure of effect that compares two or more groups in predicting the outcome variable. It is the ratio of the probability that an event (e.g. discontinuation) will occur divided by the probability that the said event will not occur i.e. a user will not discontinue contraception.

The formula that gives the odds of an event is:

$$\text{Hazard (D)} = \frac{\text{PR (D)}}{\text{PR (Not D)}}$$

$$= \frac{\text{PR (D)}}{1 - \text{PR (D)}}$$

An example is, if PR (D) = 0.25

$$\text{Hazard (D)} = \frac{0.25}{1 - 0.25} = 1/3$$

Or the probability of the event occurring is 1/3 of the probability of the event not occurring. It can be put differently that the hazard is three (3) to one (1) the event will not occur. The hazards are compared among two individual groups. In the case of one independent variable, the hazard ratio comparing its two categories are obtained from the exponentiated coefficient of the variable in the model.

The three months preceding the survey were omitted from the analysis to avoid potential bias due to underreporting of pregnancies that were in the first trimester, which could result in underestimates of rates of contraceptive failure (Curtis and Blanc, 1997; Magadi, 2001). Data was weighted for more accuracy. The Statistical Package for Social Scientists (SPSS) software version 22 was used to analyse all the data.

CHAPTER 4

TRENDS IN CONTRACEPTIVE METHOD CHOICE

4.1 Introduction

This chapter meets the first research objective to 'establish the prevailing trends in contraceptive method choice' in Kenya. It analysed contraceptive choice against selected variables to come up with a profile of contraceptive users of various contraceptive methods within the period covered by the study. It is essential for programme managers and service providers of family planning to understand the profiles of contraceptive users because method choice is influenced by these characteristics.

The focus was on the choice of modern contraceptive methods over the period 2003 to 2014 as seen from the three KDHS datasets covering the period. Towards achieving the objective, an analysis was done for the modern methods against the various socio-demographic variables of interest. This was to establish any general pattern and identify any rise, decline or stagnation in the choice of particular methods, in turn giving a general picture of the popular, less popular and less significant methods.

The different modern methods analysed were pill, IUD, injection, male and female condoms, female sterilization, implants, lactational amenorrhea method (LAM) and other modern methods as categorized in the KDHS datasets. The socio-demographic variables were age, women's education, place of residence (urban/rural), wealth and region of contraceptive use (high/low). For pill and LARC (IUD/implants) methods, a further analysis was done against children ever born (CEB) and fertility intention (spacing/limiting) respectively. The analysis in this section focused on all women aged 15-49 who were using the selected modern contraceptives during the three different surveys.

The result is a profile of contraceptive users of different methods by the identified socio-demographic characteristics presented in the subsequent graphs. These are accompanied by interpretations of the different scenarios and a discussion to explain the results regarding other similar studies. Profiles of contraceptive users are important for FP programme managers to aid in understanding the ages and types of users they are dealing with, where the users reside and their socio-demographic characteristics. The information guides the correct targeting of interventions and resources, and programmes achieve better and sustainable results.

Use of contraception begins with acceptance and choice of a contraceptive method then either continuation or discontinuation. Analysis of the method mix in contraceptive use dynamics is

critical because the use of more effective methods will result in bigger declines in fertility for a country than the use of less effective methods. The findings are presented in the form of descriptive statistics using percentages and graphs to enhance visualization of the trends.

4.2 Results

Overall Trends in the Use of Modern Methods

The general trends in the choice of major modern contraceptive methods from 2003 to 2014 for all women using contraception are shown and discussed in the following section.

Figure 4.1: Trends in the choice of modern contraceptive methods from 2003 to 2014
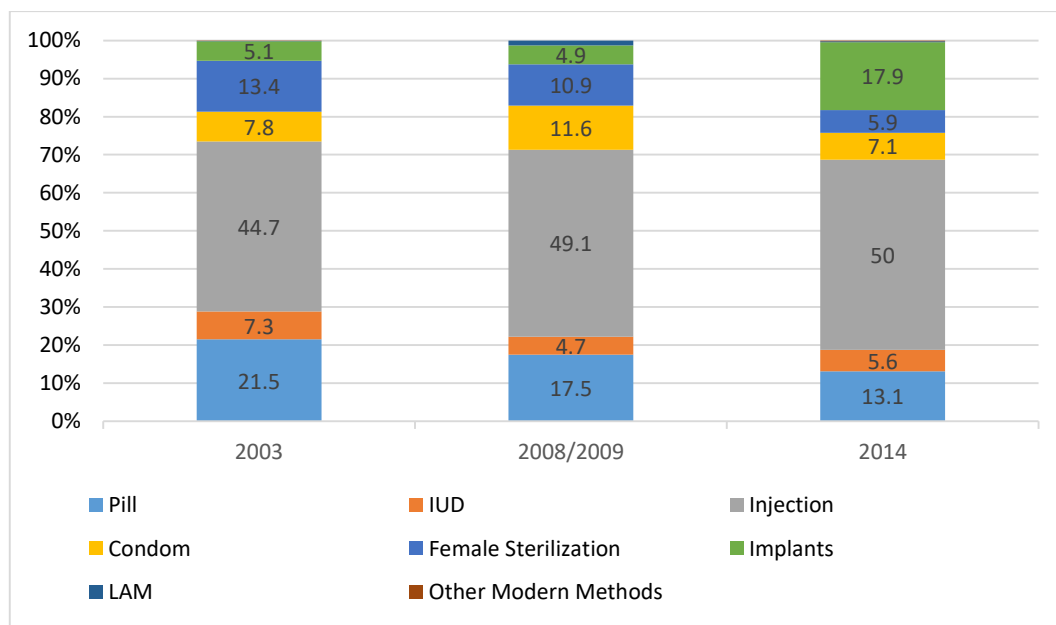
The results showed an increasing use of modern methods in general but a particularly rapid increase in the uptake of implants. The graph shows that there had been an overall consistent decline in the use of the pill among the users of modern contraceptive methods, from 21.5% in 2003 to 13.1% in 2014. There was also a significant decline in female sterilization in the period 2003 to 2014 from 13.4% to 5.9%, while use of IUD had also declined from 7.3% to 5.6 % in the review period.

On the other hand, injection was shown to be the most used modern contraceptive since 2003 and had continued the gradual upsurge in use among modern contraceptive users. Injection use increased from 44.7% in 2003 to 50% in 2014, indicating that it was being used by half of all women on contraception.

Implants had climbed rapidly from 5.1% in 2003 to 17.9% in 2014, registering the biggest increase of 12.8 percentage points among all the modern methods. In general, for the review period, implants had the biggest upsurge and had climbed up in use to become the second most used method after injection. Use of condoms rose significantly between 2003 and 2008/09 from 7.8% to 11.6% then fell to 7.1% in 2014.

Use of LAM and other methods had remained of little significance.

Trends in Type of Modern Method Currently Used by Age

The following figures show the trends in the use of five major modern methods of contraception by age.

Figure 4.2: Trend analysis for pill use and age
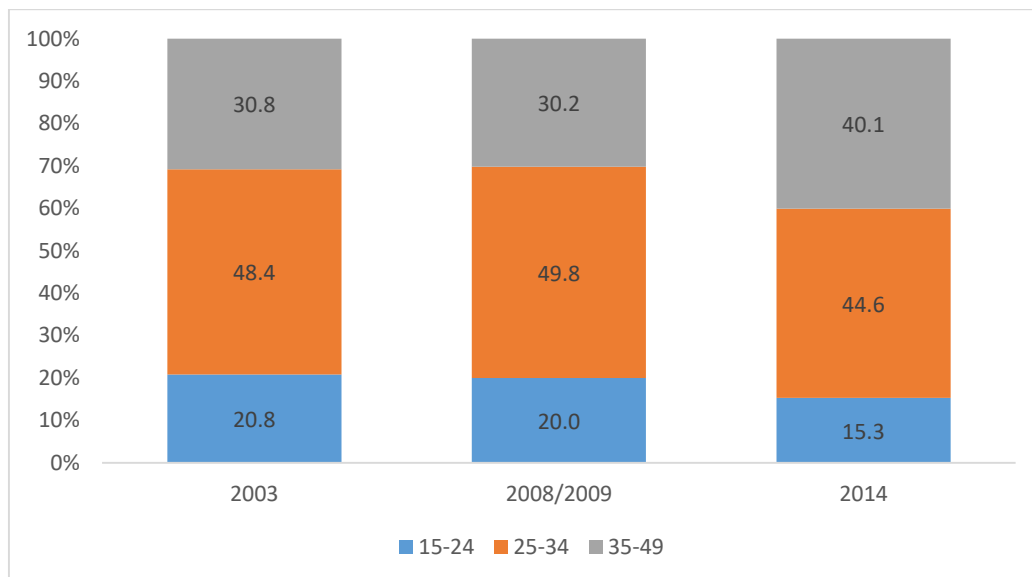
The pill showed a general plateau in use between the years 2003 and 2008/2009 but thereafter registered significant declines of five (5) percentage points each for the 15-24 and 25-34 age groups. The 35-49 age group registered a notable 10 percentage points increase in their share of use from 30.2% in 2008/2009 to 40.1% in 2014

Figure 4.3: Trend analysis for IUD use and age
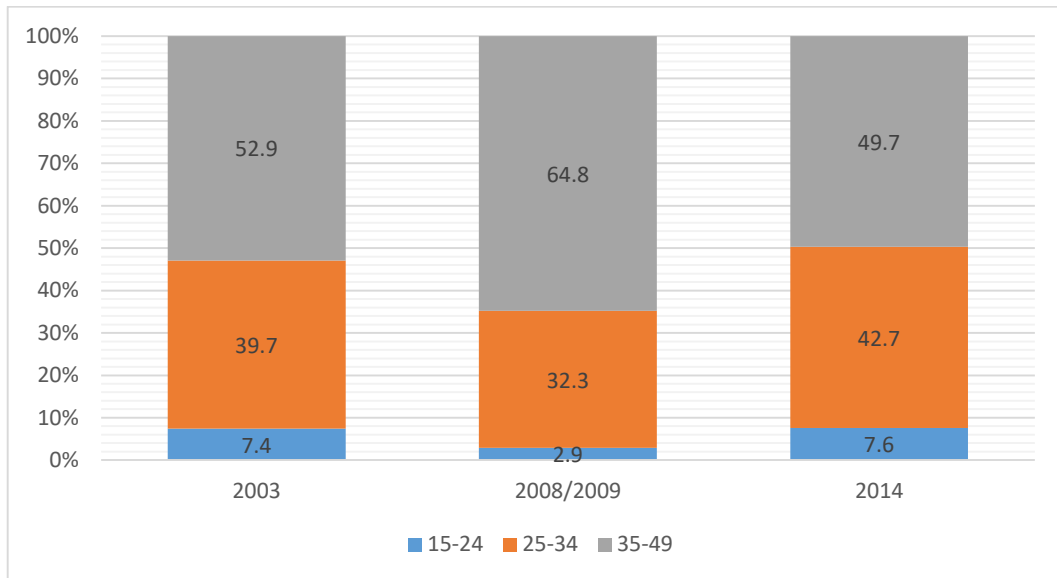
The leading users were the age group 35 to 49 years throughout the study period. Use of IUDs showed mixed changes in all age categories between 2003 and 2014 but had some significant declines and increases in use among some age groups. The 15-24 age group first registered a decline of 4.5 percentage points between 2003 and 2008/2009 from 7.4% to 2.9%, then an increase of 4.7 percentage points to 7.6% in 2014.

The 25-34 age group had a notable decline in use by 7.4 percentage points between 2003 and 2008/09 from 39.7% to 32.3%. However, it recorded a big increase of 10.4 percentage points thereafter to hit 42.7% in 2014, taking the second position in share of use.

The 35-49 age group registered an increase of 9.7 percentage points between 2003 and 2008/2009 from 52.9% to 64.8%, then a slump of 15.1 percentage points to a reduced share of 49.7% in 2014.

Figure 4.4: Trend analysis for injection use and age
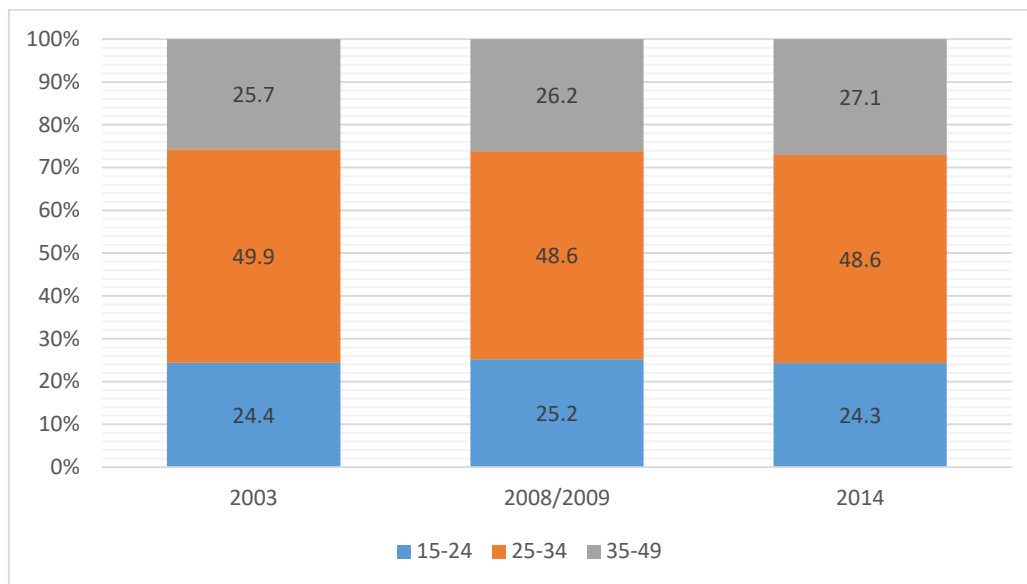
Injection registered no significant changes in most age groups and the share by age had not changed much over the period under review. The leading users were in the 25-34 age group, with about 50% share while the shares for young women 15 to 24 and their older counter parts 35 to 49 were about a quarter each (25%).

The share by women aged 35-49 had very slight increases of between 0.5 and 0.9 percentage points between 2003 and 2014. A small decline of 1.3 percentage points from 49.9 to 48.6 was seen among the 25 to 34 age groups between 2003 and 2008/2009, then the share stagnated there. Another slight decline of 0.9 percentage points among the 15 to 24 age group from 25.2% in 2008/2009 to 24.3% in 2014 was registered.

Figure 4.5: Trend analysis for female sterilization use and age
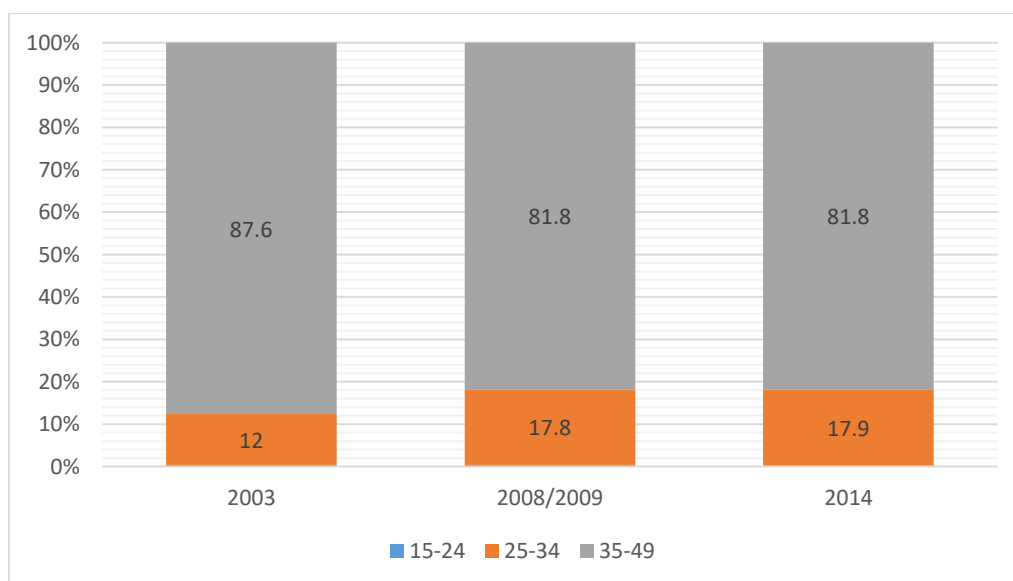
Female sterilization was dominated by the 35 to 39 age group, with a share of over 80%, which declined from 87.6 in 2003, then stagnated there at 81.8% for both 2008/2009 and 2014. The 25-34 age group showed a small share of about 12% in 2003, which significantly increased to 18% for 2008/2009 and 2014. Use was absent among the 15 to 24 age group.

Figure 4.6: Trend analysis for implant use and age
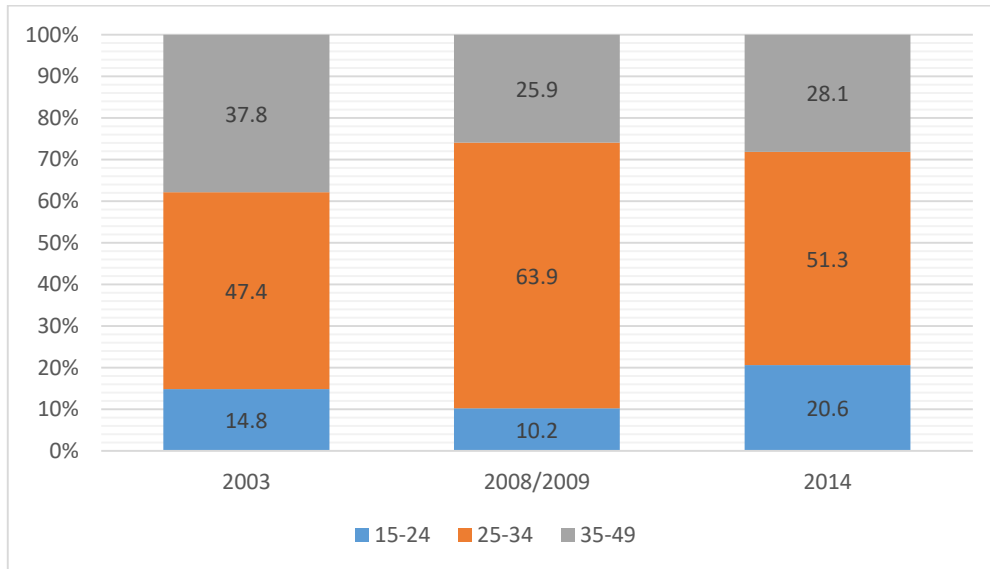
The use of implant was clearly dominated by the 25 to 34 age group, with over 50% of the share noted especially in 2008/2009, showing various changes in the different age groups. A decline of 4.6 percentage points was recorded for the 20-24 age group from 14.8% in 2003 to 10.2% in 2008/2009, then a major increase of 10.4 percentage points was seen in 2014 to put their share at 20.6%.

The 25-34 age category presented a huge increase of 16.5 percentage points between 2003 and 2008/2009, then a slump of 12.6 percentage points to 51.3% in 2014. For the 35 to 49 years' users, a major decline of 11.9 percentage points was seen between 2003 and 2008/2009, from 37.8% to 25.9%, then a slight increase of 2.2 percentage points took the share to 28.1% in 2014.

The analysis on age by each of the selected five modern methods of pill, injection, IUD, implants and female sterilization showed different changes in use for different age groups. It also showed changes in methods as well as determined shifts in method mix as women got older. This was expected as women of different ages have varying fertility intentions, either for spacing or limiting births, which determines the method they choose and use for short-term or long-term needs.

Trends in Type of Modern Method Currently Using by Education

The following figures show the trends in the use of five major modern methods of contraception by level of education.

Figure 4.7: Trend analysis for pill use and level of education
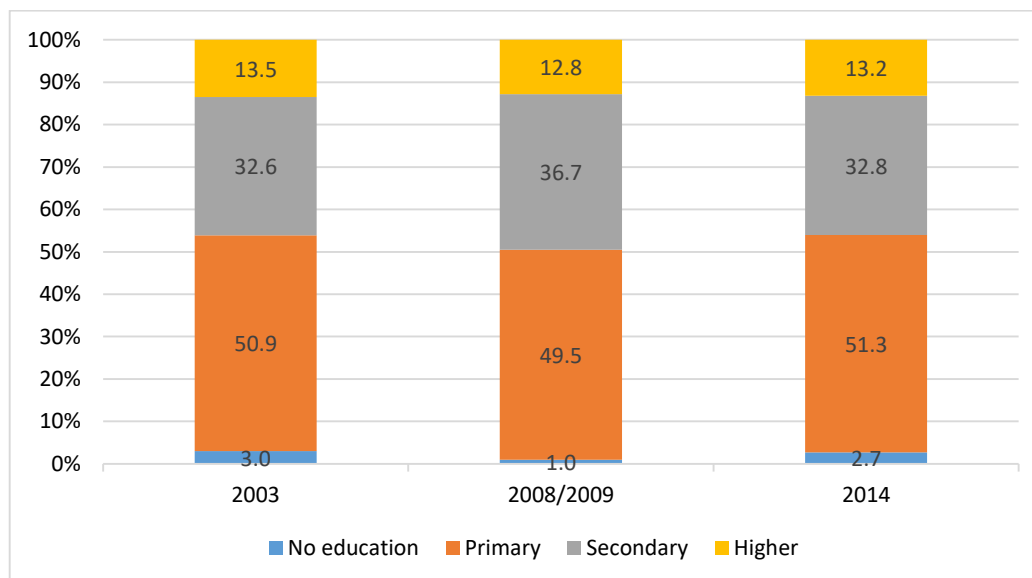
The results on education showed little change in share of use of the pill among women of all education backgrounds. Pill use was dominated by women with primary education at about 50%, followed by those with secondary education with a share of 32% to 37%. Women with higher education took up about 13% share of pill use. The least users of the pill at between 1% and 3% were those with no education.

Users in the secondary category first increased by 4.1 percentage points between 2003 and 2008/09 from 32.6% to 36.7%, then declined to 32.8% (3.9 percentage points). Among those with no education, there was a decline of two (2) percentage points from 3.0% to 1% between 2003 and 2008/2009, then an increase of 1.7 percentage points to 2.7%.

Figure 4.8: Trend analysis for IUD and level of education
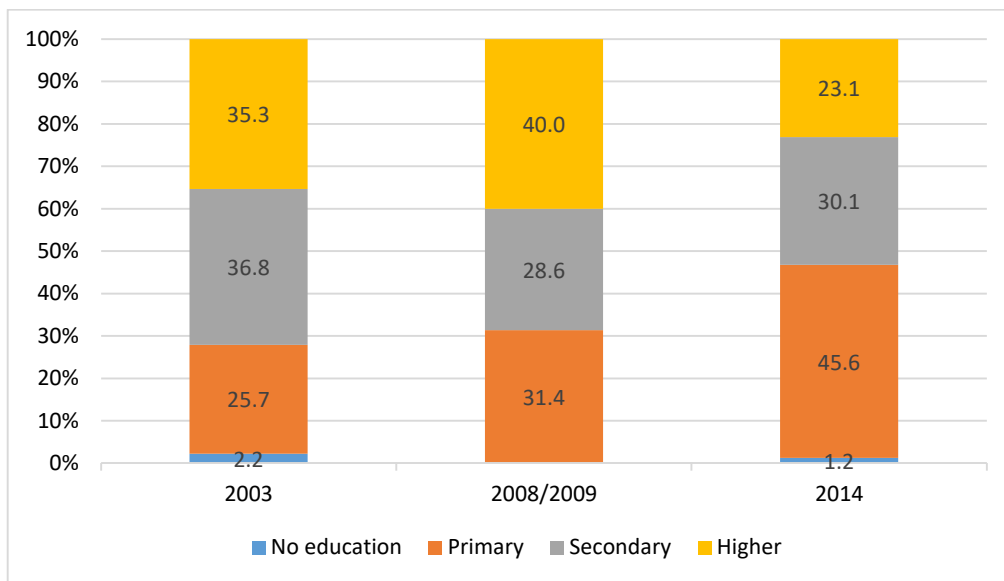
For the IUD, there were major consistent increases among women with primary education from 25.7% in 2003 to 45.6% in 2014, an increase of 19.9 percentage points. There were mixed changes for users with higher education, with an increase of 4.7 percentage points recorded between 2003 and 2008/2009 from 35.3% to 40%, then a major fall of 16.9 percentage points to stand at 23.1%. The majority of IUD users in 2003 were in the secondary category, in 2008/2009 in the higher category, and in 2014 in the primary category with a commanding share of 45.6%.

Use of IUD had registered a general decline among users of higher and secondary education backgrounds but increased among users with primary education in the period under study.

Figure 4.9: Trend analysis for injection use and level of education
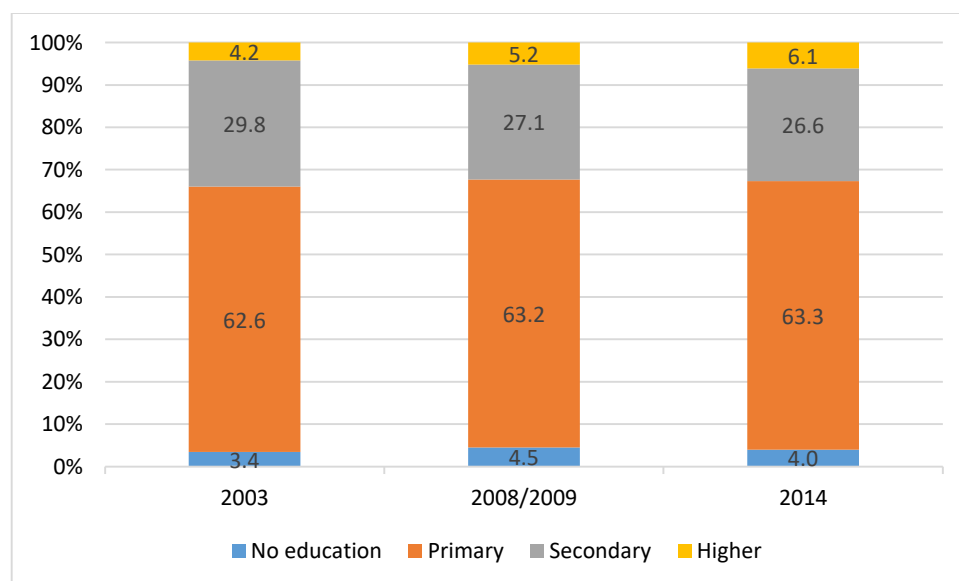
The majority of users of the injection had primary education, with a huge share of over 60%. They were followed by those with secondary education with a share of between 26% and 30%. There was little use of the injection by those in none and higher education categories. Users in the secondary education category recorded slight consistent declines from 29.8% in 2003, to 27.1% in 2008/2009 and to 26.6% in 2014, totalling to a decline of 3.2 percentage points between 2003 and 2014. Those with higher education recorded gradual increases totalling to 1.9 percentage points in the same period from 4.2% in 2003 to 5.2% in 2008/2009 and to 6.1% in 2014.

Figure 4.10: Trend analysis for female sterilization use and level of education
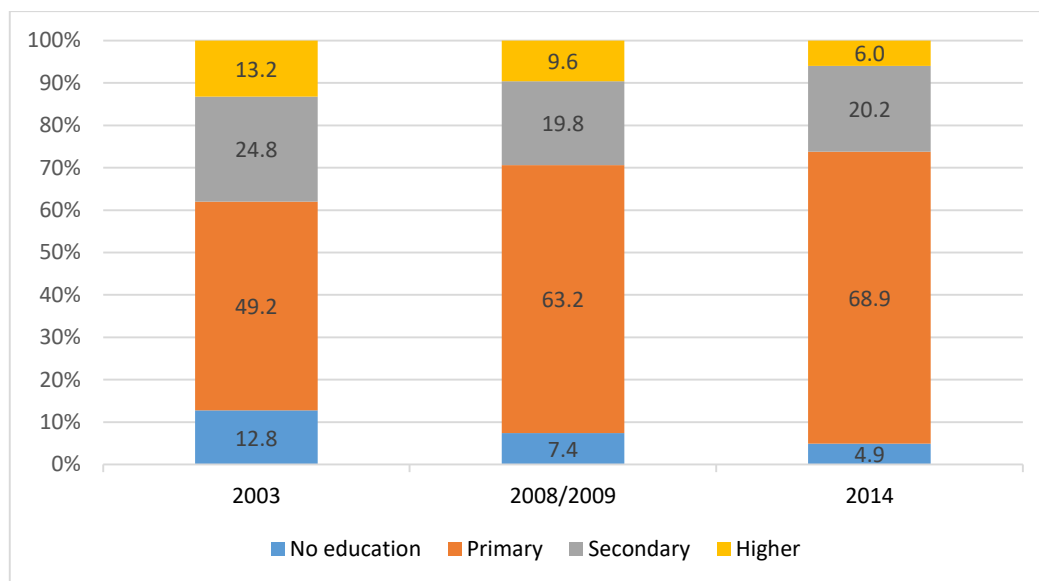
The results for female sterilization showed that an overwhelming majority of users had primary education, with a share ranging from 49% in 2003 to 69% in 2014. Those with secondary education come second and took a share of about 20% to 25%. Users with higher education showed a consistent declining trend from 13.2% in 2003 to 6.0% in 2014. This was a more than a 100% drop. A drop of five (5) percentage points was seen among users with secondary education, from 24.8% in 2003 to 19.8% in 2008/09. There was a major increase of 19.7 percentage points among users with primary education from 49.2% in 2003 to 68.9% in 2014. Use declined among those with no education by 7.9 percentage points from 12.8% in 2003 to 4.9 in 2014.

Figure 4.11: Trend analysis for implant use and level of education
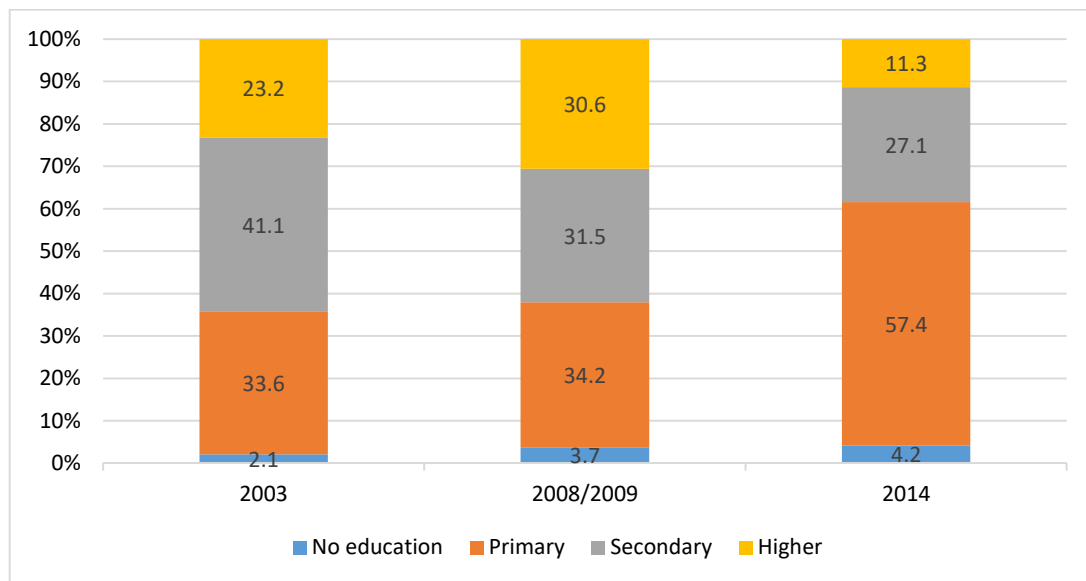
For implants, the majority of users had primary and secondary education, with each category taking between 31% and 41% in 2003 and 2008/09. For 2014 however, those with primary education took the largest share of 57% followed by those with secondary education at a considerably reduced share of 27%. Users in the higher education category had mixed changes with a 7.4 percentage point increase from 23.2% in 2003 to 30.6% in 2008/2009, then a drop of 19.3 percentage points to 11.3% in 2014. Those in the secondary education category had a consistent decline of 14 percentage points from 41.1% in 2003 to 27.1 in 2014. Users with primary education registered a huge increase from 33.6% in 2003 to 57.4% in 2014, an increase of 23.2 percentage points. Users in the no education category increased marginally across 2003 and 2014 but doubled their share in the period.

Trends in Type of Modern FP Currently Using Contraception by Residence

The following figures show the trends in the use of five major modern methods of contraception by type of residence (rural/urban).

Figure 4.12: Trend analysis for pill use and residence
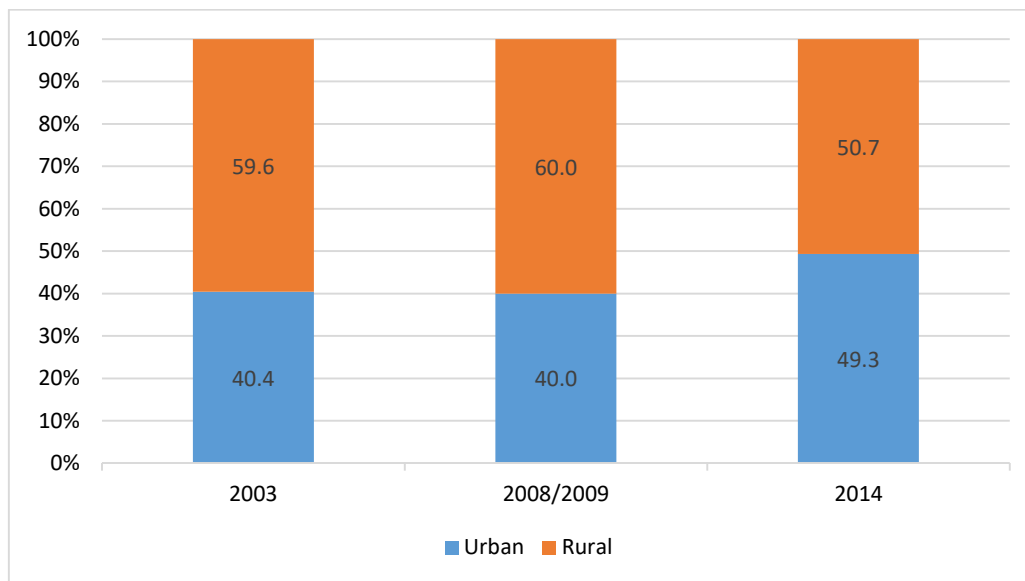
Results for the pill show that more users were in rural than urban areas. In 2003 and 2008/2009, more than 60% of users were seen to be living in rural areas. However, in 2014, the share was almost equal between those living in rural and urban areas. No notable increases were seen between 2003 and 2008/2009, but between 2008/09 and 2014, users in rural areas dropped by 9.3 percentage points from 60% to 50.7%. In the urban share, the reverse happened and there was an increase of 9.3 percentage points from 40% to 49.3% in the same period.

Figure 4.13: Trend analysis for IUD use and residence
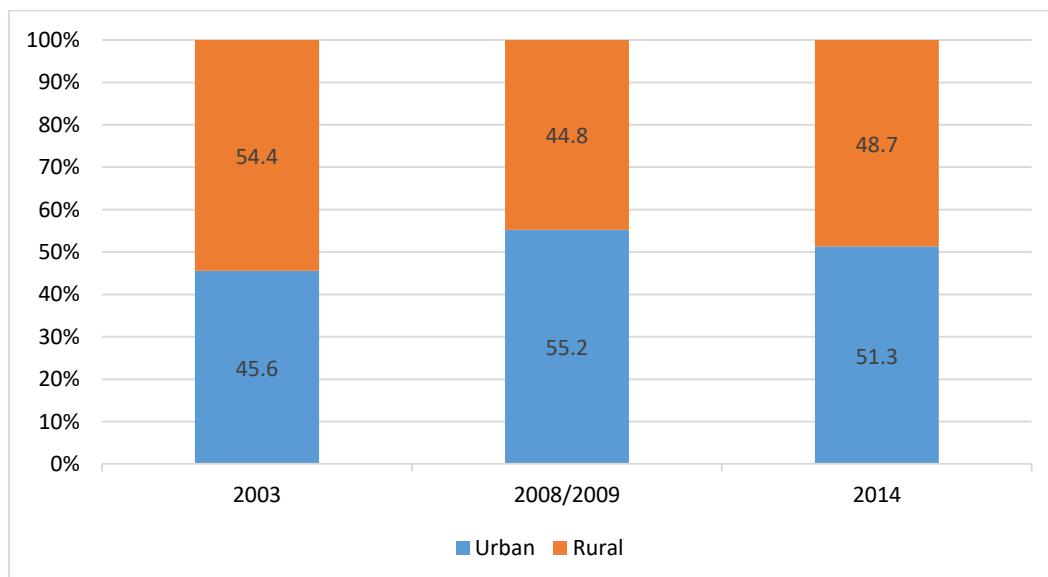
Users of the IUD painted a slightly different picture from the pill users. In 2003, more users were in the rural areas than those in urban ones at 54.4%. The reverse was true in 2008/2009, with more users in urban areas at 55.2%. In 2014, the share between urban and rural areas

evened out to almost equal. The urban share increased by 9.6 percentage points between 2003 and 2008/2009 from 45.6% to 55.2%, then dropped by 3.9 percentage points to 51.3%. In the same period, rural users decreased by 9.6 percentage points from 54.4% to 44.8%, then increased by 3.9 percentage points to 48.7%. The picture showed IUD users tending to be more urban, especially from 2008/2009 to 2014.

Figure 4.14: Trend analysis for injection use and residence
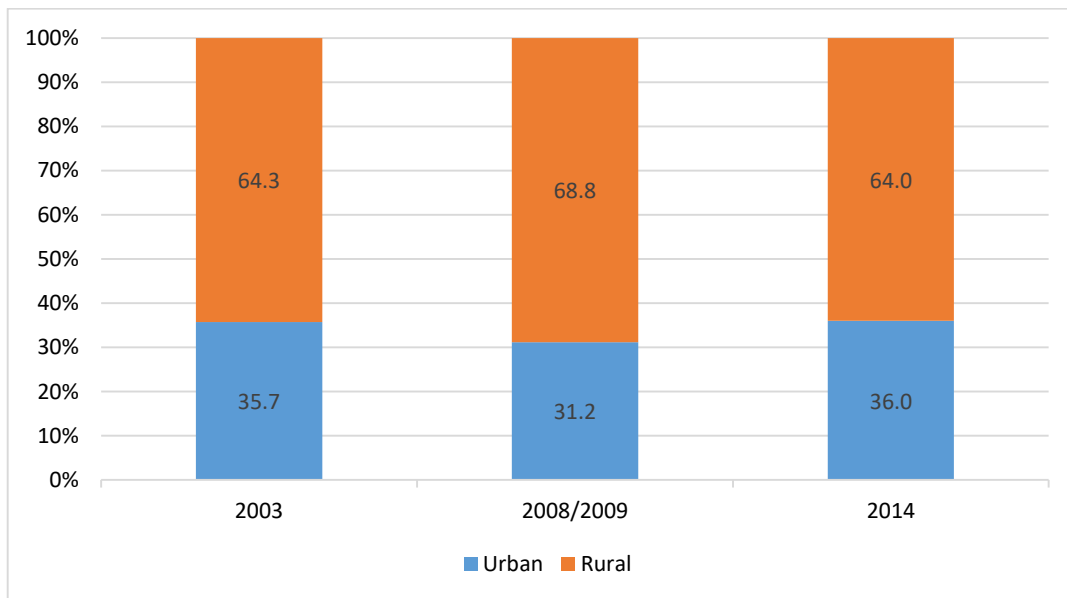
The results showed more users living in rural areas across the period with a strong share ranging from 64% to 68.8%. Rural users increased moderately between 2003 and 2008/2009 by 4.5 percentage points from 64.3% to 68.8%, then dropped by 4.8 percentage points to 64% in 2014. The reverse happened with the urban users declining from 35.7% to 31.2%, then rising to 36%.

Figure 4.15: Trend analysis for female sterilization and residence
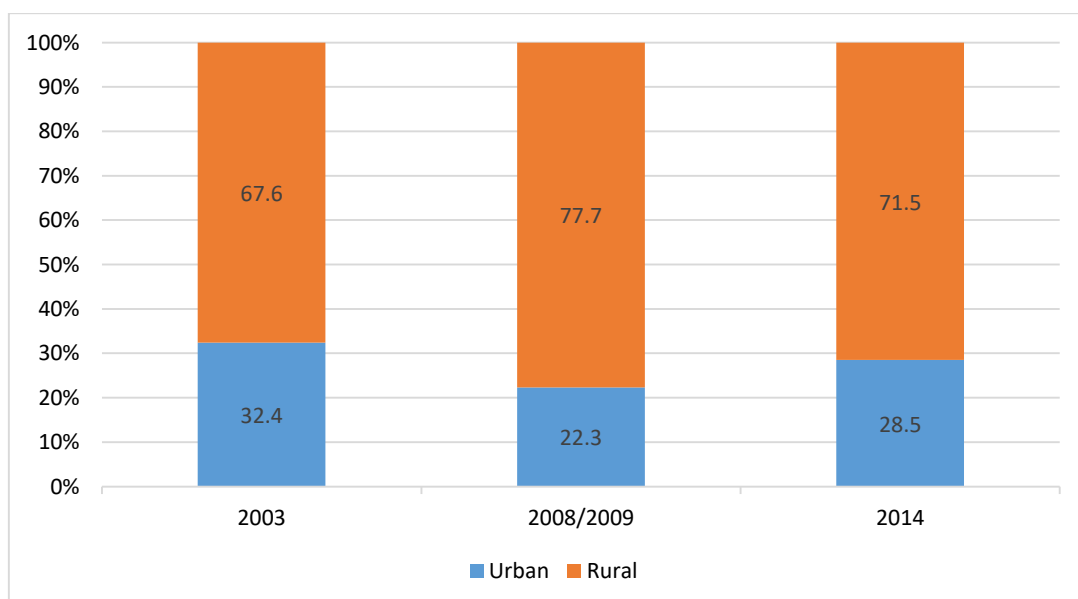
Female sterilization showed mixed reactions in general. Rural users were more by far, ranging from about 68% in 2003 to 78% in 2008/2009, then 71.5% in 2014, while urban users ranged from 22% to 32%. Rural users increased between 2003 and 2008/2009 by 10 percentage points, while urban users increased by 6.2 percentage points between 2008/2009 and 2014.

Figure 4.16: Trend analysis for implant use and residence
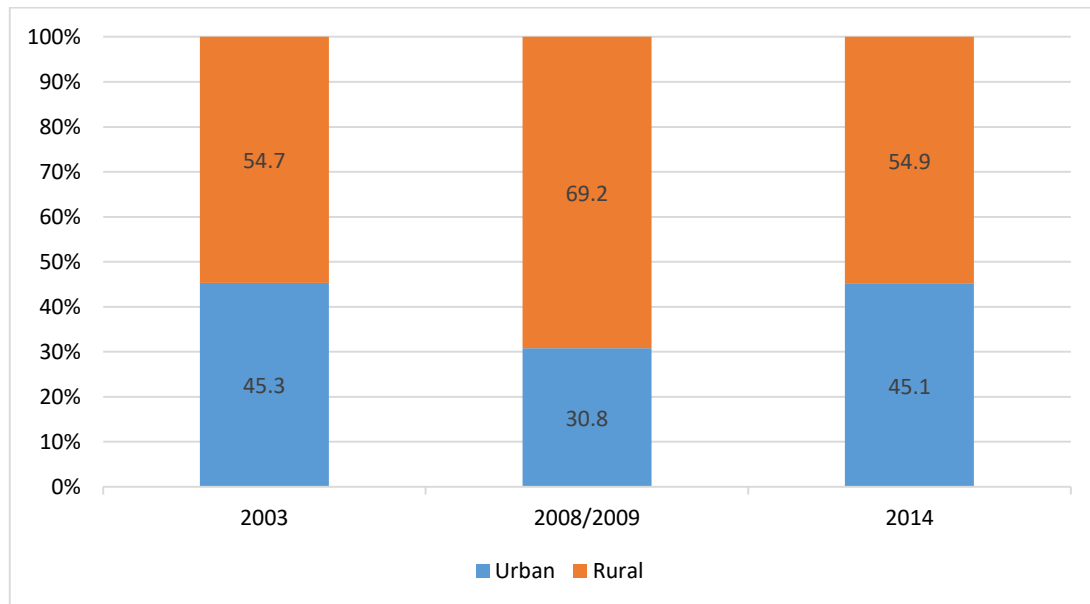
Implants analysis showed a mixed picture, with less users in urban areas but constantly changing across the period from 45.3% in 2003 to 30.8% in 2008/2009 and to 45.1% in 2014. There was a major drop between 2003 and 2008/2009 and an upward surge between 2008/09 and 2014. Conversely, most users in rural areas retained their share but it increased substantially between 2003 and 2008/2009 from 54.7% to 69.2%, then dropped to 54.9% in 2014.

Trends in Type of Modern FP Currently Using by Wealth Category

The following figures show trends in the use of major modern methods of contraception by wealth category from 2003 to 2014 for all women using contraception.

Figure 4.17: Trend analysis for pill use and wealth
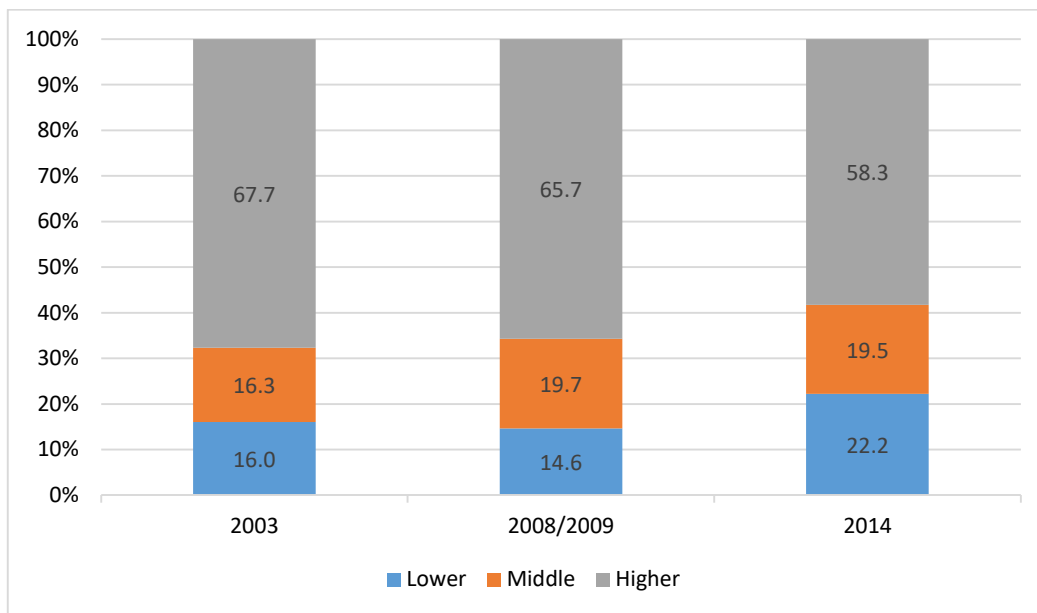
The majority of pill users were shown overwhelmingly to be in the higher wealth category but the trend showed a decline from 67.7% in 2003 to 65.7% in 20082009 and to 58.3% in 2014, a decline of 9.4 percentage points. Users in the middle wealth status were below 20% and had a slight increase of 3.4 percentage points between 2003 and 2008/2009, which plateaued in 2014. Users in the lower wealth category ranged from 15% to 22% and registered a notable increase between 2008/2009 and 2014 from 14.6% to 22.2%, a leap of 7.6 percentage points. Overall, no major differences were seen between the users in the middle and lower wealth categories.

Figure 4.18: Trend analysis for IUD and wealth
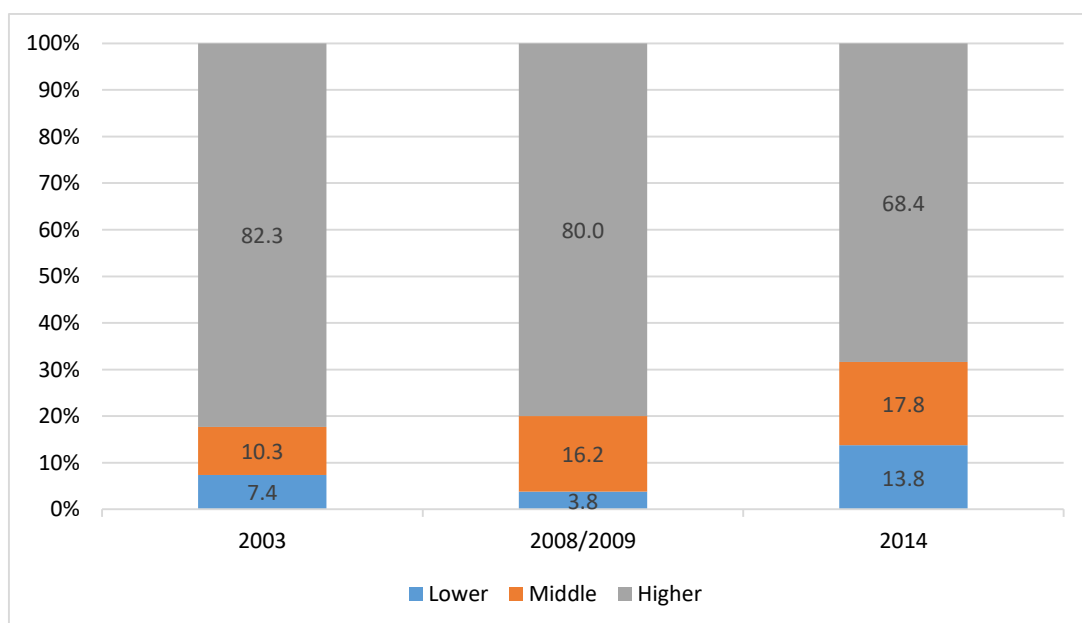
There was overwhelming use of the IUD among women in the higher wealth category at about three (3) or four (4) times the middle category. Moderate use was recorded in the middle category, while the lower category had the least use. Users in the higher category had a significant drop between 2008/2009 and 2014 from 80% to 68.4% (nearly 12 percentage points) whereas users in the lower category had an upsurge of 10 percentage points in the same period from 3.8% to 13.8% between 2008/2009 and 2014. Users in the middle category had a notable increase between 2003 and 2008/2009 from 10.3% to 16.2%, an increase of almost six (6) percentage points. Overall, in the review period, IUD use among the middle wealth bracket users increased by 7.5 percentage points, while for the lower bracket the increase was 6.4 percentage points.

Figure 4.19: Trend analysis for injection use and wealth
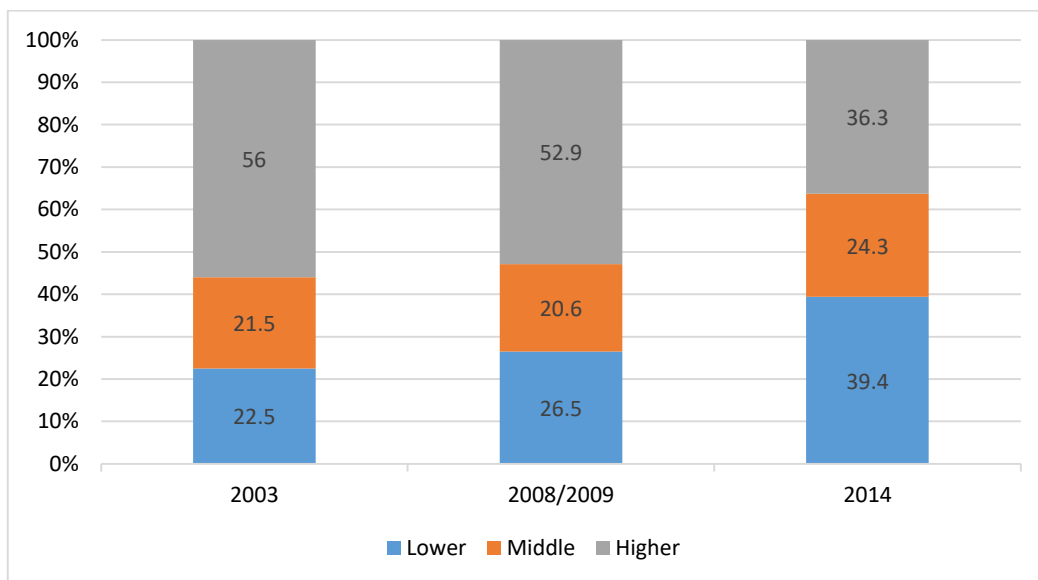
The injection had more users in the higher category in 2003 and 2008/2009, then a major drop of 16.6 percentage points snatched the lead from the category in 2014. The middle and lower categories recorded moderate use of between 20% and 39%. However, between 2003 and 2008/09, users in the lower category surged ahead to be the leading users, rising by 12.9 percentage points.

Injection recorded an increase of 2.8 percentage points among users in the middle wealth bracket between 2008/2009 and 2014 from 21.5% to 24.3% but registered a marginal decline of about 1% between 2003 and 2008/2009.

Figure 4.20: Trend analysis for female sterilization use and wealth
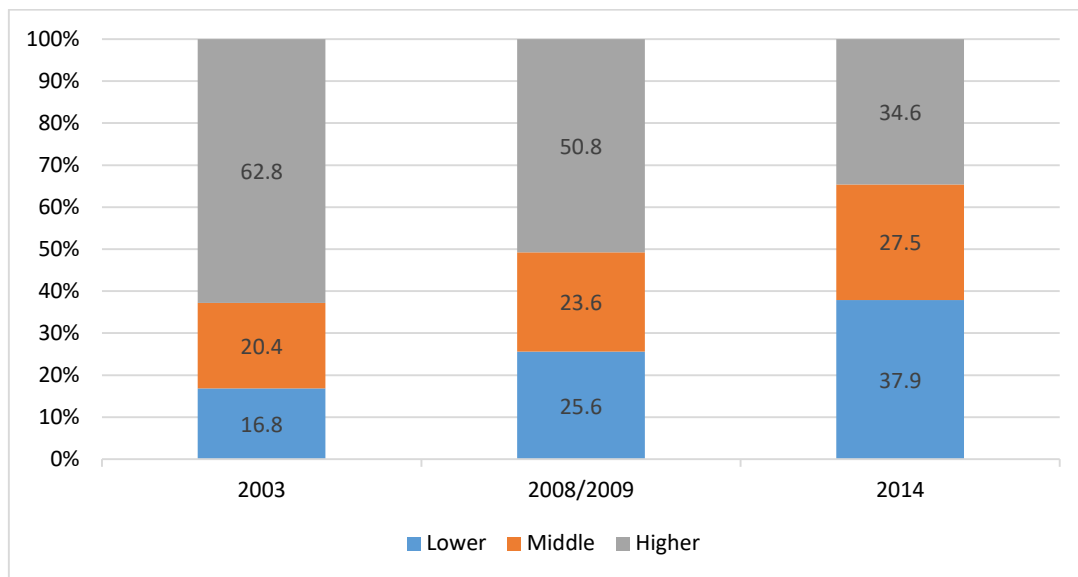
Female sterilization had most users in the higher wealth category between 2003 and 2008/2009 at over 50% share but was overtaken by the lower category in 2014 and relegated to the second position. Major consistent declines were shown by users in the higher category across all the years from 62.8% to 50.8% and to 34.6% in 2003, 2008/2009 and 2014 respectively. Users in the middle category registered small but consistent increases from 20.4% in 2003 to 23.6% in 2008/2009 and to 27.5% in 2014. Users in the lower category surged ahead continuously from 16.8% in 2003 to 25.6% in 2008/2009 and by 2014 had reached 37.9%.

Figure 4.21: Trend analysis for implant use and wealth
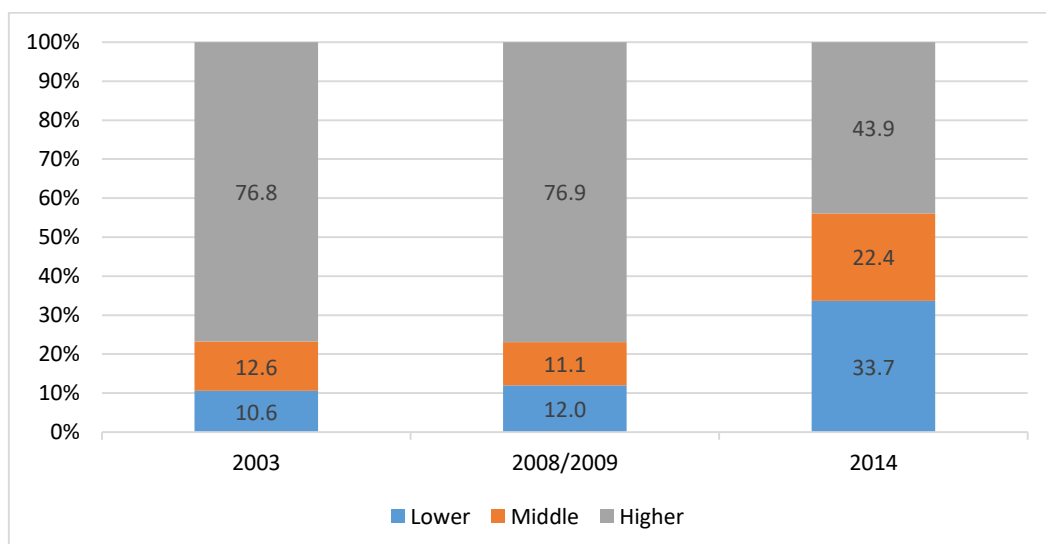
Users of the implant were overwhelmingly in the higher wealth category in 2003 and 2008/2009 at almost 77%. They registered a huge drop of 33 percentage points between 2008/2009 and 2014 to retain the lead but with a much-reduced share of 43.9%. The share lost

by the higher category was gained by both the middle and lower categories. Consequently, the middle category doubled its share from 11.1% in 2008/2009 to 22.4% in 2014, while the lower category almost tripled its share from 12% to 33.7% in the same period.

Trends in Pill Use by Women over 35 years with More Than Four Children.

The emerging issue of increasing use of the pill among women aged over 35 years with more than four (4) children (CEB>4) and ideally should be limiting births and using long-term methods, was also interrogated. Frequencies were obtained for this group by the variables of education, residence, region and wealth status. The following results were obtained:

Figure 4.22: Trend analysis for pill use for women aged 35-49 with CEB>4 by education
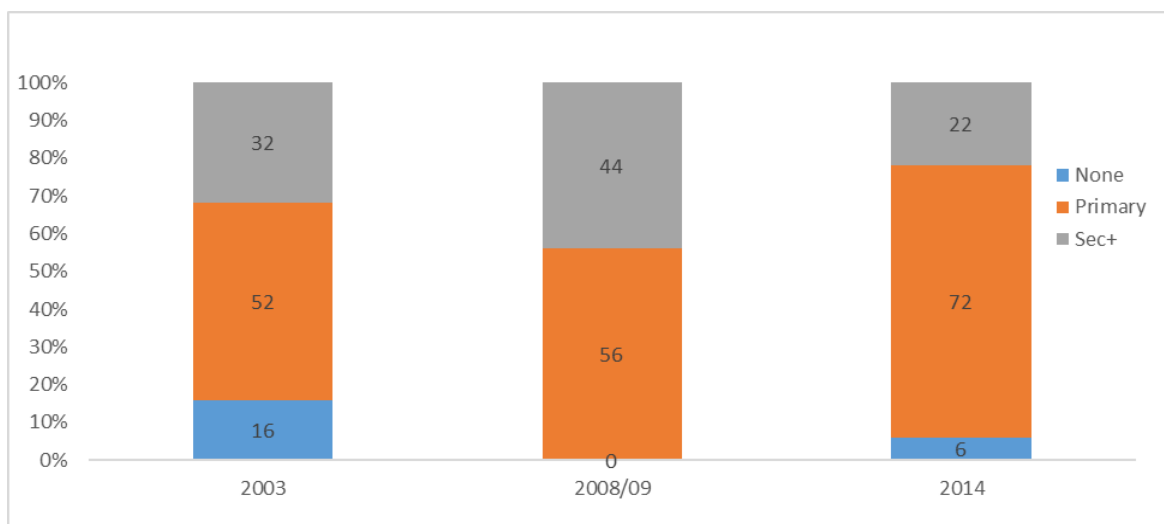
The majority users were the primary educated followed by the secondary educated. The findings showed increasing use of the pill among the primary educated group from 52% in 2003 to 72% in 2014, an increase of about 40%. A major increase of 16 percentage points was seen between 2008/2009 and 2014. There was a corresponding decline among the secondary educated users.

Figure 4.23: Trend analysis for pill use for women aged 35-49 with CEB>4 by residence
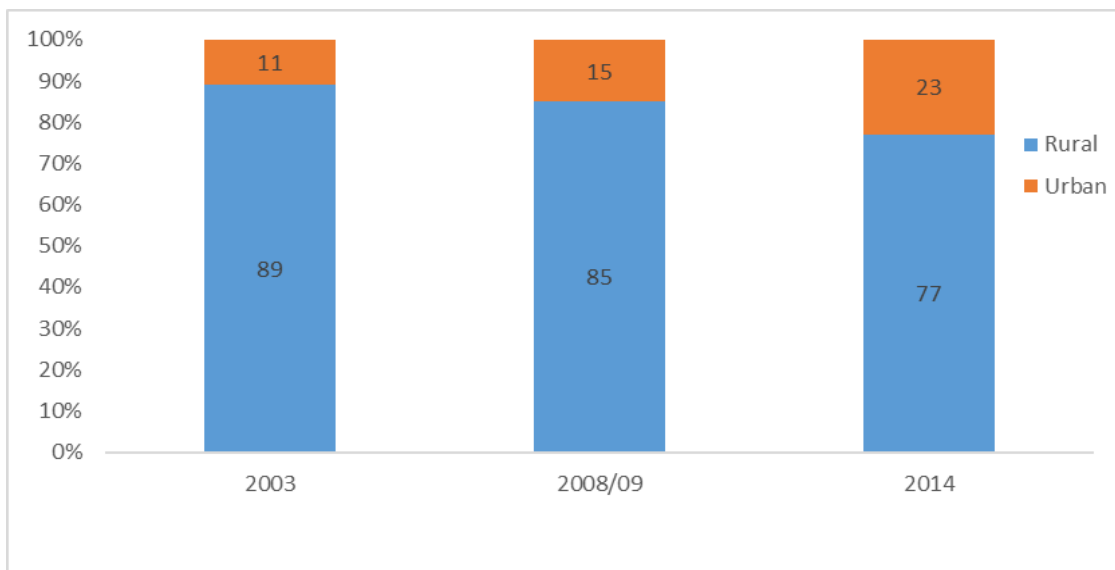
The picture here was of reduced users among the rural women, while their urban counterparts had a significant increased uptake by 100% from 11% in 2003 to 23% in 2014.

Figure 4.24: Trend analysis for pill use for 35-49 women with CEB>4 by region
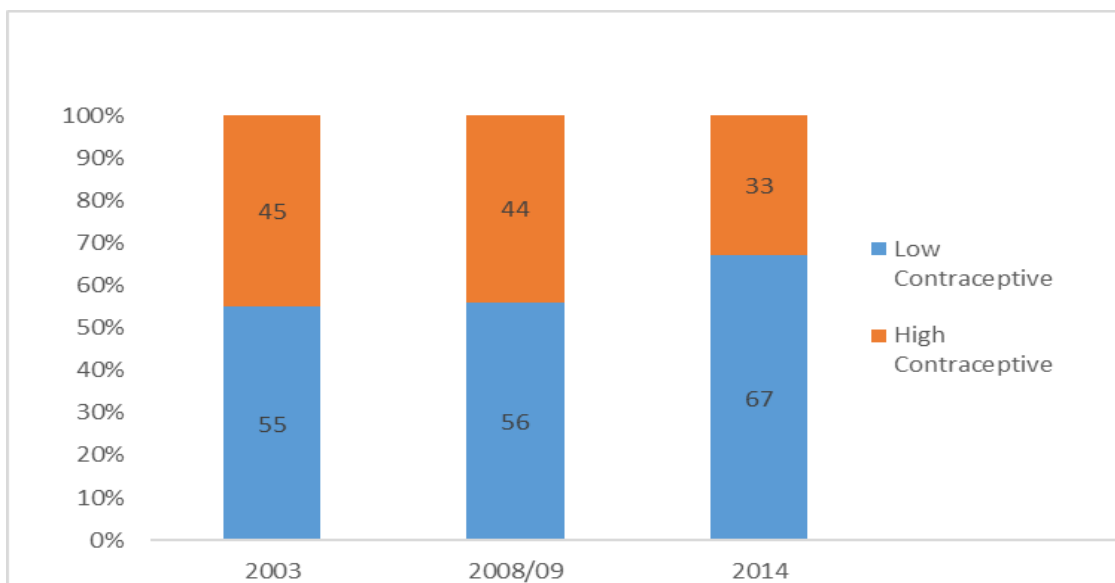
Use in regions of high contraceptive use had gone down by about 25% between 2003 and 2014, while that in regions of lower contraception had gone up by a similar margin.

Figure 4.25: Trend analysis for pill use for women aged 35-49 with CEB>4 by wealth status
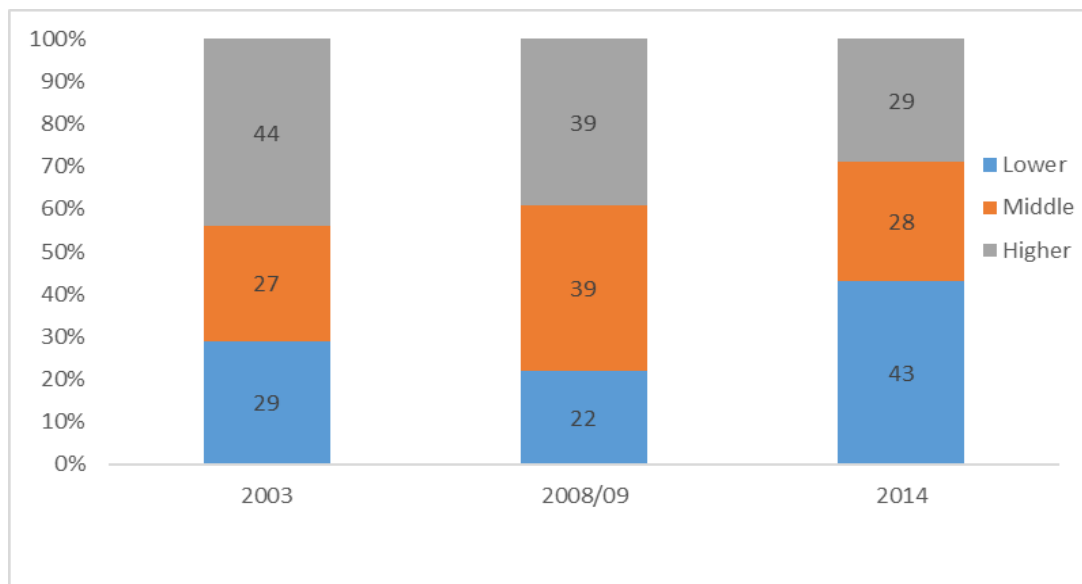
On wealth status, users from the higher and middle categories had declined in uptake mostly between 2008/2009 and 2014. However, uptake among users of lower wealth had doubled from 22% to 43% from 2008/2009 to 2014.

Trends in Type of LARC Currently Using by Region

The recent and current policy direction in Kenya has been to promote the use of LARCs and the family planning programmes introduced were focused on regions. For LARC (IUDs, implants) methods, an extra analysis was done to show their use by region as categorised in KDHS based on the former provinces. This information will be helpful in guiding policy and programme decisions on where to focus attention in the promotion of the methods.

The following figures show trends in the use of these two methods by region from 2003 to 2014 for all women using contraception.

Figure 4.26: Trend analysis for IUD use by region
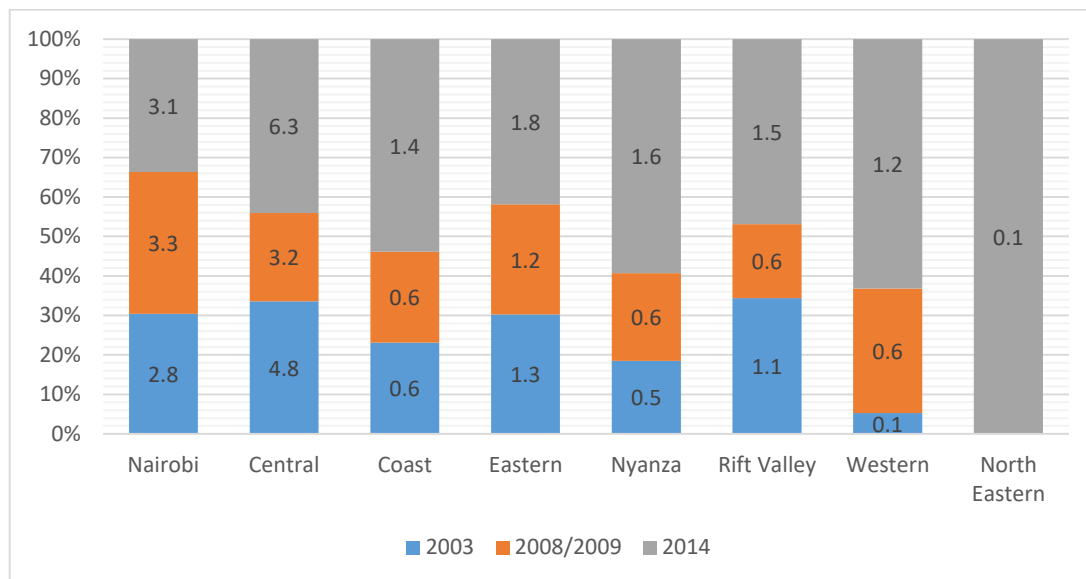
The analysis showed that in 2003, IUD use was highest in the Central region at 4.8% prevalence followed by Nairobi at 2.8%, while the lowest prevalence was in the Western region at 0.1%. In 2008/2009, Nairobi had the highest prevalence at 3.3% followed by Central at 3.2%, while Coast, Nyanza, Rift Valley and Western regions had the lowest prevalence of 0.6%. The picture for 2014 was similar, with Central region leading in prevalence at 6.3%, the highest recorded. Nairobi followed at a much lower figure of 3.1%, while the North Eastern region was last at 0.1% prevalence. No figures were available for North Eastern for 2003 and 2008/2009.

The study showed the method gaining ground across regions except in North Eastern between 2008/2009 and 2014, with the most profound change recorded in the Central region where IUD prevalence doubled from 3.2% to 6.3%.

Figure 4.27: Trend analysis for implant use by region
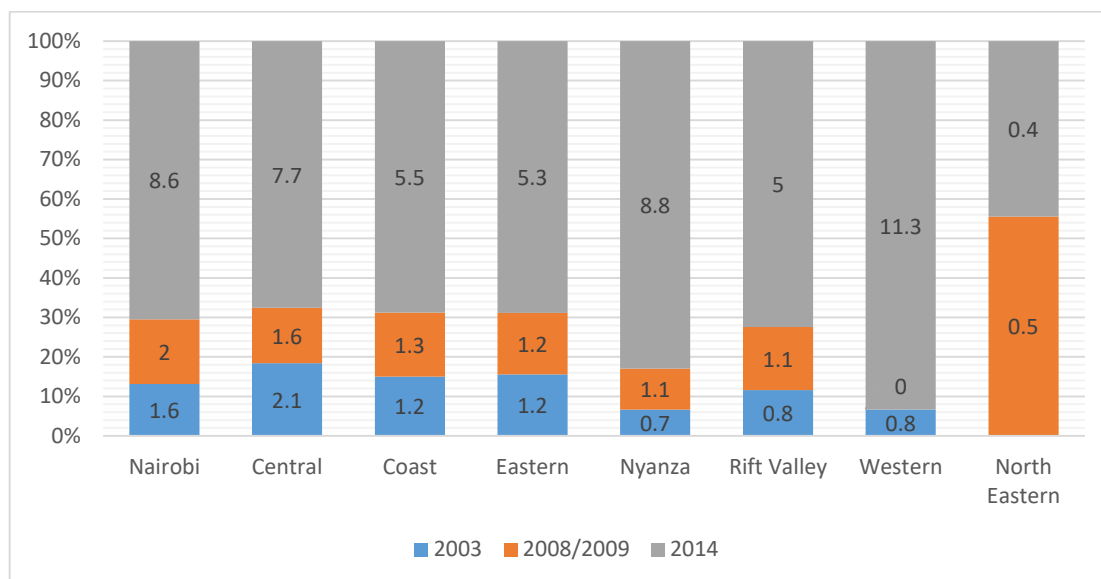
Use of the implant presented an almost similar scenario as in the IUD in 2003, with the Central region once again leading at a prevalence of 2.1% and Nairobi following at 1.6%. The lowest use in 2003 was in Nyanza, Rift Valley and Western regions. In 2008/2009, Nairobi led with a prevalence of 2%, while Central followed at 1.6%. The lowest use in 2008/2009 was in the Western region at 0.8%. A different scenario was seen in 2014 with Western region leaping ahead and taking a wide lead at a prevalence of 11.3% followed by Nyanza at 8.8%. Nairobi and Central regions were relegated to third and fourth positions respectively and North Eastern was last at 0.4% prevalence.

Trends in LARC Use by Fertility Desire

Further analysis was conducted on the fertility desires (whether spacing or limiting births) for LARC users to address policy issues of determining whether FP clients were using suitable methods based on their reproductive needs. The prevailing Ministry of Health policy is promoting the use of long-acting methods for both limiters and long-term spacers. The results are presented in the subsequent table.

Figure 4.28: Trends in LARC use by fertility desire
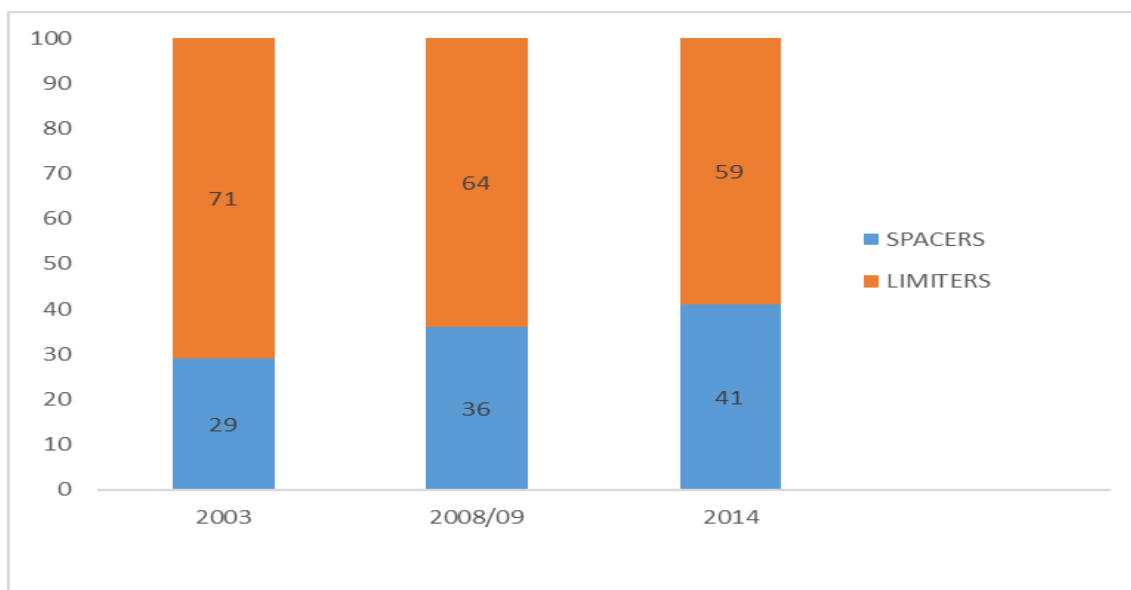
The results in all the datasets showed that most LARC users were limiters but consistent increases in use of LARC use among spacers was shown across the study period. There was a consistent total decline of LARC use among limiters by 12 percentage points to 59% in 2014 from 71% in 2003. Countering this was an equal gain among women spacing births from 29% in 2003 to 41% in 2014.

4.3 Discussion

Overall Trends

In Kenya, the injection has persisted as the most popular method of contraception, with 50% prevalence, followed by implants in second position at 17.9% prevalence, according to the study findings. However, the continued rise in use of injectables in Kenya had slowed down, especially between 2008/2009 and 2014.

This trend for the injection was an upward trajectory established in the 1990s when the method started gaining popularity rapidly from a prevalence of 1% in 1984, to 12% in 1998 (Magadi et al, 2001; 2003). The global picture on most popular methods is different as female sterilization (19%) and the IUD (14%) respectively were the two leading methods used by married women or those in union as at 2015(UN, 2015).

Globally, the picture of increasing use of the injection is not unique to Kenya but is the norm in sub-Saharan Africa. About 25% of users have adopted this method, which is the most prevalent in Ethiopia, Malawi and Rwanda among other African countries. The method is also the most popular in Asia, for example in Indonesia (UN, 2018; Tsui, 2017). The uptake of

implants had increased recently in various countries (Ross et al, 2015) and Kenya had not been left behind (Jacobstein, 2018; PSI, 2015).

The analysis also showed an increase in the use of condoms in 2008/2009 to 11.6% from 7.8 % in 2003 then slumped to 7.1% in 2014, hence little change in share at the end of the review period. Globally, condom use varies by region, and stands at about 11% share of users. Use in sub-Saharan Africa is generally low but severely low in West Africa at less than 2%. In Eastern Africa, prevalence is less than 3% in most countries. In Southern Africa, it is much higher at about 10% (UN, 2018; Ross et al, 2015).

The condom is important as a dual method of contraception as well as prevention against sexually transmitted infections and more so HIV/AIDS. Kenya has had very innovative social marketing programmes for the condom advocated by Population Services Kenya (PSK) that ensured demand creation. However, a shift in HIV funding prioritising treatment and commodity security has led to reduced messaging since 2007 and was possibly the cause of the stagnation in the use of condoms (Mann Global Health, 2017). Use of LAM did not register any significant change in the period under review.

Pill

About half of pill users in Kenya were seen to be in the 25-34 age category, meaning that the method was mostly used as a short-term method by those spacing births. This has been the trend in Kenya since the 1990s. Other continuing trends identified in earlier studies were that half of the users were in the 25-34 age bracket and that the majority of users had primary or secondary education (Oketch et al, 2011; Magadi et al, 2001).

A surprising observation was the major increase of over 30% in use among the 35 to 49 age group between 2008/2009 and 2014. This group is dominated by women who have most likely achieved their fertility desires or are limiters but still need to prevent pregnancy. A programme/ policy issue arises here: Why would limiters be shunning the long-term and more effective methods expected of the age group while increasingly using shorter-acting, less effective and sometimes less convenient methods? One reason could be that they have reduced sexual activity, hence less risk of pregnancy and thus find long-term methods unnecessary (Palamuleni, 2013). Women in this group and especially the ones over 40 years may be using the pill to address issues of irregular or heavy bleeding common in the perimenopause period. Combined pills are also credited with reduced risks of endometrial, ovarian and colorectal cancers (Cho, 2018; Nouhjah et al, 2013). The women may also be suffering from medical

conditions that may deter them from using some contraceptive methods (Allen et al, 2013). Increased use of the pill in this group could also reflect delayed fertility where they are spacing instead of limiting births. The United States of America has reported increasing births among this group (Hamilton et al., 2018). Increasing use of the pill among women of older ages was reported in the US as early as in 2008 (Kaunitz, 2008).

The results on increasing pill use among women aged over 35 years with more than four (4) children point to a need to target urban, primary educated women of lower wealth from lower contraceptive use regions in the promotion of LARCs. A recent study in Ghana has found urban, more educated women shifting from more effective methods to a blend of less effective methods such as condoms, withdrawal and periodic abstinence. They are complementing the methods with emergency contraception, possibly in an attempt to deal with side effects (Marston et al., 2017).

A shift in usage by residence was observed where in 2003 and 2008/2009, slightly more users were in the rural areas. However, in 2014 the rural-urban share almost evened out. This is possibly due to the rapid rate of urbanization being experienced in the devolution era. The Constitution of Kenya, 2010 decentralised power and the provision of services, allocating national revenues to 47 counties under a new system of devolved governance that was implemented from 2013.

The results in the study showed a major decline of 8.4 percentage points or about 40% in the period 2003 to 2014. The decline in the use of the pill can perhaps be attributed to the inconvenience of its daily dosage, which has been associated with compliance challenges and failure of the method. Another possible reason for the declining use of the pill is the persistent issue of adverse health effects associated with it like migraine, menstrual cycle disorders, breakthrough bleeding, nausea, vomiting and increased risks of breast cancer and depression. All these side effects are linked to its oestrogen levels (Moreau et al, 2007; Magadi et al, 2001). Studies have documented older women as less likely to use pills than younger women and are thus more inclined towards long-acting or permanent methods. Male and female sterilization methods are naturally found more in older users, but the pill remains a leading method among older women in some regions (Picavet et al, 2011).

Although the pill has been shown to be very effective at 99% if used correctly, there is a global shift away from its use towards the injection and LARCs. Globally in 2011, its prevalence was 8.8%, while in Africa it was 7.8% and in sub-Saharan Africa 4.3%. Zimbabwe is perhaps the

only country in Africa where the pill dominates, with a CPR of 40.9%. However, even there, implants use has multiplied eight-fold in the last decade, whereas use of the pill has plateaued and dropped substantially (Jacobstein, 2018; UN, 2015). Thus, the declining trend in Kenya is not abnormal and will most likely continue.

IUD

The findings showed mixed fortunes with the 35 to 49 age group as the leading users at 50% share or more and the 25 to 34 age group inching closer upwards. The IUD is struggling to maintain its share of use, but not gaining much success. It remained at the bottom in share of use at 5.6% in 2014. This is unlike the global picture where IUDs are among the most popular reversible methods of contraception. As at 2011, their global prevalence was 14.3%, while in Africa it was 4.4% and in sub-Saharan Africa 0.5% (Ross et al, 2015).

IUDs last for five (5) to 10 years and are safe and excellent choices for users who need long-acting convenient, hormone-free and very effective contraception. They are suitable for women and couples who desire to limit their families and do not require many return visits. They are therefore convenient in terms of time. The effectiveness of the method, however, depends on the correct insertion procedure (Bryant et al, 2015; Wildemeersch, 2011).

Other benefits of IUD include immediate return to fertility after removing the device, and reduced risks of ectopic pregnancy. It can also act as an emergency contraception if inserted within five days following an unprotected sexual encounter. IUD is suitable for use soon after delivery because it does not hinder breastfeeding and is cost-effective, as a user does not require revisits to a health facility for re-administration (Melissa et al., 2012).

In spite of these benefits, it is not very popular in many countries because of rumours and fears of side effects. Some of these include heavy menstrual bleeding and pain, uterine perforation and expulsion (STEP UP, 2014; Diamond-Smith et al, 2012).

The IUD has never experienced extensive use in sub-Saharan Africa and has not been very popular (Gebremedhin et al, 2016), hence the current low share in Kenya is not unique. However, the situation was not the same three decades earlier. IUD controlled a sizeable share of 31% of the method mix in Kenya in 1984, but the share declined thereafter. The method is currently heavily underutilized because of rumours and misconceptions about its effectiveness, convenience and provider attitudes and bias. There have been renewed efforts to generate demand, improve supply and increase its access and use led by the Ministry of Health. The

success of these interventions might change its fortunes as a neglected LARC. (The ACQUIRE Project/Engender Health, 2006; Ikamari, 2011).

Injection

From the study results, the injection had remained the dominant contraceptive method in Kenya having increased its prevalence from 44.7% to 50%. This translated to a 5.3 percentage points gain in method share in the period 2003 to 2014. The gain was not surprising and has been the trend in Kenya since the 1990s, with the method popular across users of different characteristics (Magadi et al, 2001).

There was also a continued increase in the uptake of injectables from 12% in 2003 to 26% in 2014 among currently married women. The use of modern methods increased from 32% to 53% for the same group (KNBS, 2004; 2010; 2015). Increase in use of injection was also recorded among adolescent girls.

Recent data from other studies support these findings and show injectables taking up more than half of the method mix in Kenya, and in Ethiopia and Malawi. In Malawi for example, the share of the injectable method increased almost seventeen-fold between 1992 and 2010 from a marginal 1.5% to a tremendous 26%. Tanzania also had an increase of 27 times within 18 years, while in Ethiopia the prevalence of the method rose to over 70% (Jacobstein, 2018; Gebremedhin et al, 2016; Adetunji, 2011).

Injectables are a crucial part of the overall method mix and have prevailed as the dominant method of contraception. They have accounted for 43% of the modern contraceptive use (mCPR) share in sub-Saharan Africa, 49% in Eastern Africa and 46% in Southern Africa. Evidence from various DHS studies shows the proportion of married women using injectables in sub-Saharan Africa in 2009 stood at 6.8%, almost double that of the global average at 3.5%. By 2015, 5% of women contraceptive users globally were on injectables. (UN, 2015; Jacobstein and Polis, 2014; Adetunji, 2011)

Study results showed the injection on a gradual upward trend, which was not seen much in the age, education and residence profiles. The changes were most explicit in the wealth profiles. A major increase of 16.9 percentage points is seen in the lower category, while a major decline of 20 percentage points occurred in the higher category between 2003 and 2014.

Injectables accounted for the largest proportion of the method mix for the 25-34 age bracket, but no major changes were seen there. Notable were small increases in the shares by women aged 35-39 by one (1) percentage point from 13.9% in 2003 to 15.0% in 2014 and by the 45-

49 age group by 1.4 percentage points from 2.6% in 2003 to 4.0% in 2014. These are women moving towards the end of their reproductive cycle and are most likely limiting their births, and therefore face greater health risks from unintended pregnancies. Sterilization and implant methods might involve long journeys and might therefore not be viable options. The women are looking for a convenient and effective method they will not forget to take, and which likely has non-contraceptive benefits. (Huber and Huber, 2009; Godfrey et al, 2011).

The 40-44 age group however registered a gradual consistent decline in share. They seemingly benefitted the share of pill use, which had increased throughout the study period. On a smaller scale, implants' share had increased slightly between 2008/2009 and 2014. This age group has lower fecundity and lower risk of pregnancy than younger women. They could have special needs in terms of contraceptive choice as some may already have perimenopause symptoms. Others might want a long-term or permanent method, hence could be switching from the injection method (Allen et al, 2013).

The leading position of the injection method may be because of its attraction such as freedom from daily doses as in pills. The convenience of being given once every three months means fewer visits to the family planning clinic and less financial implications. All these factors work together to give the method a high potential for covert use, as there is no evidence that a woman is using a contraceptive method. This works well for women whose partners do not approve of contraception or among partners who disagree on the number and spacing of pregnancies. The method offers privacy and only the user and their service provider are aware of its use (Adetunji, 2011; 2006; Phillips and Bawah, 2005; Biddlecom and Fapohunda, 1998).

Injectables can also be used by breastfeeding mothers and are attractive to users who may have issues with the possible side effects from the oestrogen in pills. In addition, injectables have therapeutic effects as well as other hidden non-contraceptive benefits. These include reduced risks of sickle cell anaemia crises, symptomatic pelvic inflammatory disease, uterine fibroids, endometrial cancer and ectopic pregnancies. They may also increase levels of iron in the blood. The high acceptance of the method may also be because it is more accessible and simpler to administer compared to the LARCs (Gebremedhin et al, 2016; Lande and Richey, 2006; Kaunitz, 2000).

Use of the injection is boosted a lot by satisfied users. In Ghana and Zimbabwe, its popularity was attributed to its effectiveness, recommendation from satisfied users, low risk of forgetfulness, and longer spans before re-injection. Over 90% of users reported satisfaction

with the method and were willing to recommend it to others (Laryea et al, 2016; Adetunji, 2011). It is recognized that the rise of injectable use has played a critical role in the increase of contraceptive prevalence in Kenya in the past two decades (Harbison and Adetunji, 2009).

On residence, use of injection in Kenya in the review period showed faster rates of increase of injectable uptake in the rural areas than in urban areas. Rural users exhibited more use of injectables than their urban counterparts throughout the review period, with a share of over 64%. This is expected because service delivery points in rural areas may be far apart and difficult to access. It also serves women well and it is cheaper to visit a family planning clinic once every three months. The need for covert use may be more prevalent in the rural areas where women are less empowered and satisfaction with the method is consequently higher. Other studies have found the prevalence of injectables as increasing more in the rural areas than in urban ones. A study in a rural area of Zimbabwe found high satisfaction levels among users of the DMPA injection (Mitchel and Thistle, 2004).

The analysis by wealth categories noted a slightly bigger share of the injectable by the lower category. Users in the lower wealth category might constitute the majority of rural users and the rural areas normally have fewer effective contraceptive choices. The findings suggest better service availability of the method in rural areas.

On education, the prevalence of injectables was highest among women with primary level education, according to the study findings. Injectable users were found to be similarly educated in earlier studies in Kenya (Magadi et al, 2001), while their use was elsewhere found to decline with increasing education levels. (Gomez and Clark, 2014, Koenig et al, 1997). However, other studies have yielded conflicting results on education (Ali and Cleland, 1999; Laing, 1985).

On a negative side, although evidence was not conclusive and the quality and type of studies was an issue of debate, there were claims in South Africa that some types of the three-month injections such as Depo Provera increase the risk of contracting HIV by up to 40% and that the injection may suppress immunity. A reactive study, the Evidence for Contraceptive Options and HIV Outcomes (ECHO) trial on over 7000 HIV negative women in eSwatini (formerly Swaziland) Kenya, South Africa and Zambia examined the existence of a causal relationship between DEPO and acquisition of HIV. The results, released in 2019, revealed that there was no evidence to back the claims and concluded that the method was safe and effective. The unproven claims may explain the increasing prevalence of the implants as users switch from

the injection. However, a two-month injection, NET-EN, is an alternative without the cited risks (ECHO, 2019; ECHO, 2015; Noguchi et al, 2015; Polis et al, 2014)

In addition, Depo-Provera, a popular injection, has been alleged to pose serious health risks to women that have not been even remotely addressed by programme managers and service providers. The adverse effects are said to manifest themselves not during the use of Depo-Provera but upon stopping use (Wershler, 2016).

Female Sterilization

Female sterilization showed stagnated progress in the age group profiles especially among 35 to 49-year-old users who should be driving the use of the method. The method had registered huge declines among women of all education backgrounds but a monumental decline of 32.7 was seen among women with no education in the period between 2003 and 2014.

It also recorded declines in both urban and rural areas in the review period at 6.8 and 8.0 percentage points respectively. The highest declines recorded between 2003 and 2008/2009 in urban areas, with a drop of 5.6 percentage points; and between 2008/2009 and 2014 in the rural areas, with a drop of 6.2 percentage points.

On wealth profile, female sterilization registered declines in the review period, with the highest of over 6 percentage points for users in the low and medium wealth status. There was a steady increase on use of the method in the medium wealth category and a more than two-fold increase among users in the lower category between 2003 and 2014. The reverse happened with users in the higher wealth category, where use declined by almost 100%. Use of the method was dominated by women in the lower category as Magadi and Curtis, 2003 had earlier reported.

Use of female sterilization was found to have an overall decline of about 56% during the review period. This was expected, and the trend had been noted by Magadi et al (2001) in a previous comprehensive study on contraceptive use dynamics in Kenya. As this study results show, it seemed there was a continuation of the shift in contraceptive use away from female sterilization, which is a permanent, irreversible method and towards long-term but reversible methods.

Female sterilization is a contraceptive method for users who want to limit childbearing, not spacing. Family planning messages in Kenya and elsewhere in Africa mostly focus on spacing children, not limiting hence the method is not encouraged and it is no wonder the use is limited. Knowledge about the method is also sparse and the method is not available in most health facilities as it requires specialised service from medical doctors. A study that attempted to

explain the declining trends in the use of the method found that service providers were deliberately discouraging women from using the method. They were instead recommending the use of LARCs, which is the current policy direction in most countries including Kenya (Chen et al, 2008)

However, female sterilization was doing better globally. In 2015, it had a prevalence of 19% among married or in union women aged 15-49 years. The method is not as popular in Africa because of religious and cultural issues. The average prevalence of the method is about 2% and in over 25 African countries the prevalence is below 1%. It is popular in some parts of Asia, the Americas and Oceania, with an average prevalence of 26% in those regions. The highest prevalence for the method globally was in the Dominican Republic at 47% (UN, 2015). As at 2011, global prevalence was 18.9% and in sub-Saharan Africa it was 1.6%. The highest prevalence in Africa were in Cape Verde (14.8%) and South Africa at 14.3% (UN, 2011).

Earlier studies showed demand for female sterilization existed in Africa, but services provided were inadequate (Joseph and Haws, 1990). Increase in Kenya had previously doubled between 1984 and 1998 (Magadi and Curtis, 2003). Malawi, to increase method mix, took a deliberate step to increase uptake of the method. Trends in female sterilization are going against the general tide of decline in Africa and instead are registering its increased use. The country in 2012 had a 10% prevalence, which was one of the highest in Africa. The method defied the odds to climb to position two in terms of prevalence in Malawi (UN, 2018; Jacobstein, 2013). Uganda also showed increasing need for the method among limiters in the rural areas from 54% to 63% between 2002 and 2008, but more so among HIV positive women (Lutalo et al, 2015)

In Brazil, the most preferred and used method was female sterilization, with the rejection of hormonal contraception possibly driven by the characteristics of service provision in the area. Women, including those who had never used them, reported a general fear of the side effects of hormonal contraceptives and opted for sterilization (D'Antona et al, 2009). On another positive note, the method is alleged to reduce the risk of pelvic diseases (Joshi et al, 2015).

Implants

Implants showed a 300% upsurge across the review period from 2003 to 2014. Their highest use was among the 25-34 age bracket, with a share of over 50%. The 15 to 24 age group recorded a two-fold increase between 2008/2009 and 2014 and drove the increase in uptake.

Users of implants with primary education were the highest group with 57.4%. They registered the most increase by 13.8 percentage points between 2003 and 2014, but the increases were seen much more between 2008/2009 and 2014.

Implants users were mostly in the rural areas at 55%. Urban users were increasing and had registered a 15 percentage points rise. Users in the rural users had a similar decline between 2008/2009 and 2014.

Implants use showed an upward trend, mostly from 2008/2009, with major changes in all the wealth groups. The higher wealth group reduced its share by 23 percentage points. This seemingly boosted the lower wealth group, which increased its share by the same figure. The medium wealth status users doubled their share in the same period.

Use of implants was shown to have increased more than three-fold in the review period. This rapid rise may be mainly attributed to the success in the promotion of the use of LARCs in Kenya from around 2010 and more so after the development of the National Family Planning Costed Implementation Plan 2012-2016 (MoH, 2012). Kenya was also found to have undergone the highest increase in implant use among 12 African countries. It had a total gain in implant prevalence of 8.3 percentage points from 2014 to 2016 and led in implant use in the world (Jacobstein, 2018).

An initiative called the Implant Access programme has seen organizations make it more accessible and affordable in low-resource countries. In Kenya, the Tupange project worked on scaling up the uptake of implants within five urban towns over a span of five years with much success (Keyonzo et al, 2015; Duvall et al, 2014; BMGF, 2014).

Implants have proved to be highly effective, with roughly about 0.05% failure rate in the first year of use. A rate of unintended pregnancy of roughly one (1) in 2000 is another advantage. If used correctly in the first year, they are estimated to be 120 times and 180 times more effective than the injection and combined pills respectively. Implants are rated to be the most effective contraceptive method and work for three (3) to five (5) years. Some of their benefits are that if a user has side effects, the implant can be taken out at any time, and their fertility will return soon after. They are very useful for women who cannot use contraceptive methods that contain oestrogen (Jacobstein and Polis, 2014).

Before 2010, the prevalence of implants globally was below 1% of mCPR among married or women in union. The prevalence was 0.3% in Africa in general and 0.4% in sub-Saharan Africa (UN, 2011). Recent studies however show implant use rising in many sub-Saharan African

countries. In the period 2008 to 2012 for example, Marie Stopes International supplied 1.7 million implants to 15 countries in sub-Saharan Africa, with supplies overwhelmingly rising from 80,000 to 750,000 (Laryea et al, 2016; Jacobstein and Polis, 2014).

Kenya is therefore not unique in the rising popularity of the implant and is only joining a regional trend. In Rwanda, the implant is third in method prevalence, with a contraceptive prevalence rate of 6.3% among married women, one of the highest in Africa and elsewhere. Implants have risen to second position in popularity in Burkina Faso and Ethiopia (Tsui et al, 2017; Joshi et al, 2015; Jacobstein and Polis, 2014).

Implants are also being promoted and are gaining popularity among young women. They are becoming a leading option for the young Kenyan women population that initially sought short-term methods. A study to promote LARCs among young women found a favourable uptake and high continuation rate for the implant (Hubacher et al, 2012).

LARC Methods

A lot of attention is currently globally focused on LARCs, which refer to methods of contraception that can be used for more than one year following a single administration. LARCs include intrauterine devices (IUDs) and implants, both of which are associated with efficiency, convenience and sexual acceptability. They are highly effective and less costly in the long run when compared against shorter-acting contraceptives (SACs), and can be used by nearly all women including adolescents and those who have never had children (Tsui et al, 2017).

They effectively protect against pregnancy, with only about 0.05 to 0.8 % of women experiencing method failure during the first year of use. Their benefits include no daily dosage and little effort is required to maintain their effective long-term protection. They ensure a quick return to fertility after a method is discontinued, and the safety of their use following abortion, births and while lactating. They are also very suitable for women who opt for oestrogen free contraceptive methods (Joshi et al, 2015).

LARC use is linked with high effectiveness, user satisfaction and low contraceptive discontinuation rates in comparison to short-term methods. Expanding access to LARCs as part of the full range of family planning (FP) methods, is a critical component of FP programmes that seek to deal with high incidences of unintended pregnancies and reduce the high levels of unmet need for contraception (Higgins J, 2014). In the US, more LARC use has come with a dramatic effect in reduced unintended pregnancies and consequently abortions (Shoupe, 2016).

Introducing both implants and IUDs is necessary for the attainment of targets set out by the FP2020 project to increase contraceptive uptake, reduce unmet need and expand contraceptive method mix. Globally, between 2008 and 2014, the use of implants rose by 1567%, while that of IUDs increased by 429%. The number of LARC services delivered in 2014 were more than ten times the services rendered in 2008 (an increase of 1037%). Implant uptake has been higher than for IUD, suggesting more acceptability of implants, possibly because it is easy to insert, has long efficacy, or it is hormonal (Ngo et al, 2017). In the US however, the IUD is doing better than the implants, probably because more health professionals have been trained on inserting IUDs than implants (Shoupe, 2016).

The use of LARC methods is globally increasing, with trends showing movement from less effective to more effective methods, which is the trend seen in Kenya from this study. LARCs were seen to have a strong combined share of 23.5% in 2014, which is almost double that of 12.4% in 2003. Also, their increased use has been most evident among users with primary education for both the IUDs and implants.

The prevailing high levels of modern contraceptive uptake show several methods, but mainly long-acting and permanent methods playing a key role. More than one-third of married or in-union women across the globe opt for LARC and permanent methods. These methods took 56% share of contraceptive prevalence as at 2015 (Branum and Jones, 2015; UN, 2015).

Among the LARCs, the implants have picked up well in sub-Saharan Africa by increasing their share of users, but the IUD has not encountered similar success. This is probably because of the challenges of insertion and misconceptions by users, which brings to the fore the effectiveness and side effects of the method. An interesting turn in Uganda has shown that the use of both IUDs and implants among rural limiters declined by half from 3.3% to 1.7% between 2002 and 2008, while the use of female sterilization increased (Lutalo et al, 2015).

From this study, LARC use in Kenya is shown to be picking up gradually in most regions and speedily in others. Central, Nairobi, Nyanza and Western are the leading regions by prevalence for the two methods. A striking result is the phenomenal rise of IUD use in Central region and that of implant use in Western and Nyanza regions between 2008/2009 and 2014 (Kungu et al, 2020a). It may suggest to a shift of strategy in the promotion of LARC in the regions and can inform managers of family planning programmes on the interventions in other regions.

4.4 Summary of Discussion

From the study findings and the discussion, it has come out clearly that the levels and trends in modern contraceptive use in Kenya are similar to the ones in sub-Saharan Africa. This is especially so for Eastern Africa in terms of the profiles of the users, most popular methods, the methods whose use is increasing, and those whose use is declining.

The use of modern methods has continued to rise in Kenya but the method mix is skewed towards the injection, which remains the leading method with a 50% prevalence. This is almost triple that of the second leading method, implants. However, the rise in use of implants was phenomenal, to the tune of three-fold in the review period. Indications were that the speedy rise would continue because the current global promotion favours a shift towards the method.

The pill and the female sterilization methods have continued to decline in use among their traditional users, while the IUD has not picked up despite being a LARC. The most popular method for adolescents and young women is the injection. However, there was a major upsurge in the use of implants from 2008 to 2014, with their uptake more than doubling.

Looking at the profiles of contraceptive users, most users are in the 25 to 34 age brackets for the pill, injection and implants methods. The use of the IUD and female sterilization is dominant among the 35 to 49 age bracket. Other dominant characteristics of most users are that they have primary education and live mostly in the rural areas.

Looking at method and residence, all methods except the IUD show declining use between 2008 and 2014. On the wealth profile, there was consistent increase among users of lower wealth status for all methods. Some small increases were seen in the users in the middle wealth category for all methods. For the higher wealth category, declines were registered for all the methods. Likewise, a general decline was observed among users with secondary education for all methods, except the injection whose use was rising among users with higher education. These observations give some credence to the findings of a study by Marston et al, (2017) in Ghana, where highly educated women living in urban areas were using less of the highly effective modern contraceptive methods. They were using more of inconsistent, periodic cocktail of traditional and emergency methods. This resulted in a general decline in the use of modern contraceptive methods, the low fertility recorded among the group notwithstanding.

As observed elsewhere (Kungu et al, 2020a), the general shift among all users is from shorter-acting contraceptives methods (SACs) towards LARCs for their efficiency, convenience and high user satisfaction.

CHAPTER 5

DETERMINANTS OF CONTRACEPTIVE METHOD CHOICE

5.1 Introduction

This chapter responds to the second objective, to identify the determinants of contraceptive method choice. The analysis sought to establish the socio-demographic factors that significantly influence contraceptive choice from among the selected ones.

Determinants of contraceptive method choice has emerged as an increasingly important area of research. This is because family planning programmes have turned their concern away from just encouraging adoption of methods towards the reproductive health of individual women and couples (Mannan, 2002).

Socio-demographic factors refer to the characteristics of the individual and the environment they live in. These characteristics give an important background to their attitudes, understanding, exposure, quality of life and access to services which may promote or hinder them from initiating contraception. Some of the factors identified as closely associated with the choice of contraception in Kenya are socio-demographic variables such as age, wealth, education, region and residence (Kimani et al, 2013; Obare et al, 2011; Magadi et al, 2001). These are the factors selected for analysis in this study together with marital status, another important factor.

Determinants of contraceptive method choice are the factors that can explain the choice of contraception (explanatory variables). They are assumed to start from the individual characteristics of the women (age, education), through the status of the household (wealth) and type and place of abode (residence and region). They go on to affect the behaviour, lifestyle, and access to contraception choice (response variable). The factors are complex because they are inter-linked and vary from place to place and time to time (Palamuleni, 2013). Modern contraceptive methods were classified into short-term (condom, pill injection), long-term (implants, IUD) and permanent (female/male sterilization).

5.2 Distribution of Contraceptive Users by Background Characteristics

The first stage of analysis for the chapter sought to categorize the women in the sample according to their background characteristics to get their profile as presented in Table 5.1.

Table 5.1: Percent distribution of all women of reproductive age by major modern contraception methods and background characteristics, 2003-2014

Variable	2003	2008/09	2014
N	1853	2197	10,979
		Percent (%)	
Age			
15-24	20	22	22
25-34	42	43	45
35-49	38	35	33
Education			
None	4	4	4
Pry	52	55	58
Sec +	44	41	38
Residence			
Rural	60	63	60
Urban	40	37	40
Wealth status			
Lower	18	21	33
Middle	18	19	30
Higher	64	60	44
Region			
Low Contraceptive	77	74	64
High Contraceptive	23	26	36
Method used			
Short term	74	79	70
Long term	13	10	24
Permanent	13	11	6
Marital status			
Married/Living Together	82	82	82
Not Married/Not Living Together	18	18	18

The findings on the background characteristics give a clear profile of the users of the major methods of modern contraception among all women aged 15-49 years.

On age, most users were aged between 25 and 34, taking about 43% share across the three data sets followed by the 35 to 49 age group with about 35% across the study years. A good majority of the women (about 55%) had primary education, while those with secondary education took about 40% share over the study period. The majority of the study population was living in rural areas, with a share of over 60% across the study period.

In 2003 and 2008/2009, a large majority (over 60%) of the modern method users were in the higher wealth status but the figure reduced to 44% in 2014. Corresponding to the decline was an increase in users among the lower wealth category from 21% to 33% and among the middle category from 19% to 30% between 2008/2009 and 2014.

Regions with high contraceptive use comprising Nairobi, Eastern and Central, recorded a major increase in users of modern methods, from 23% to 36% across the study period. Lower contraceptive use regions had most modern method users, but on a declining trend from 77% in 2003 to 64% in 2014. The majority of contraceptive users were married at 82% across the study period, while the not married comprised the remaining 18%.

On the choice of method, the majority of the sampled women reported using short-term methods at an average of 75% over the study period. Short-term methods increased slightly between 2003 and 2008/2009 then took a declining path towards 2014 to record a decline of nine (9) percentage points, from 79% to 70%. Use of permanent methods declined by half across the study period, from 14% in 2003 to 6% in 2014.

In general, use of long-term methods had no major change between 2003 and 2008/09 but from there almost doubled from 13% in 2008/09 to 24% in 2014. Use in terms of residence had no notable variations.

5.3 Differentials in Use of Different Contraceptive Methods

The next stage of the analysis involved cross-classifying women by their background characteristics and type of current contraceptive method used. This was designed to identify any significant associations between the method used and the independent variables. The results are presented in Table 5.2.

Table 5.2: Percent distribution of contraceptive users by type of method for all women of reproductive age, 2003 to 2014

Variable	2003			2008/09			2014		
	Short-term	Long-term	Permanent	Short term	Long-term	Permanent	Short-term	Long-term	Permanent
N	1853			2197			10,979		
Age				Percent (%)					
15-24	93	7	0	97	3	0	81	19	0
25-34	84	12	4	85	11	4	72	26	2
35-49	53	16	31	61	13	26	62	23	15
	X^2=354.774 df = 4 sig =.000			X^2=335.296 df =4 sig = .000			X^2= 806.057 df =4 sig = .000		
Education									
None	53	6	41	73	5	22	70	22	8
Pry	80	7	13	81	6	13	71	22	7
Sec+	69	20	11	77	15	8	70	26	4
	X^2=116.503 df =4 sig = .000			X^2= 73.004 df =4 sig = .000			X^2= 55.208 df =4 sig = .000		
Residence									
Rural	74	11	15	79	7	14	71	22	7
Urban	75	14	11	79	14	7	69	27	4
	X^2= 8.795 df =2 sig = .012			X^2= 42.520 df =2 sig = .000			X^2=69.436 df =2 sig = .000		
Wealth status									
Lower	82	6	12	83	4	13	73	20	7
Middle	77	8	15	80	7	13	71	22	7
Higher	71	16	13	78	13	9	68	27	5
	X^2= 31.555 df =4 sig = .000			X^2= 42.216 df =4 sig = .000			X^2= 69.747 df =4 sig = .000		
Region									
Low Contraceptive	73	13	14	78	10	12	70	24	6
High Contraceptive	79	10	11	84	9	7	71	23	6
	X^2= 8.106 df =2 sig = .017			X^2= 13.993 df =2 sig = .000			X^2= .758 df =2 sig = .684		
Marital status									
Married	72	14	14	78	11	11	70	24	6
Not Married	85	7	8	84	6	10	75	20	5
	X^2= 22.925 df =2 sig = .000			X^2= 8.810 df =2 sig = .012			X^2= 25.492 df =2 sig = .000		

Note: P-value = 0.05

In the cross-tabulation analysis between the individual, independent socio-demographic variables and the dependent variable method choice (categorised as short-term, long-term and permanent methods), all the variables showed significant association with method choice, except for region in 2014.

5.4 Age and Method Choice

Age showed significant association with method choice in all the survey years. For the 15 to 24 age group in 2003, there were 93% users of short-term methods who increased to 97% in 2008/2009 then declined to 81% in 2014. This was a decline of 16 percentage points. In 2003 and 2008/2009, long-term method users stood at 7% and 3% respectively while in 2014 the

share increased six-fold to 19%. As expected, there were no women using permanent methods across the study period for this age cohort.

For the 25 to 34 age group, about 85% were using short-term methods in both 2003 and 20082009, then the share declined to 72% in 2014. On long-term methods, in both 2003 and 2008/2009, the share was about 12% but in 2014 it more than doubled to reach 26%. Users of permanent methods were about 4% in 2003 and 2008/2009 but a decline to 2% was recorded in 2014.

In the 35 to 49 age group, there was an increase of 8 percentage points in uptake of short-term methods from 53% in 2003 to 61% in 2008/2009, then it stagnated at that level. Long-term users were about 15% in 2003 and 2008/2009, then registered a major increase to 23% in 2014. There was a 31% share of users of permanent methods in 2003, which declined to 26% in 2008/2009 and to 15% in 2014. In the study period therefore, the share of permanent users declined by half from 31% to 15%. The loss corresponded to a similar gain for long-term methods.

5.5 Education and Method Choice

Education also showed significant association with method choice in all the years. For those with no education, use of short-term methods for the group was 53% in 2003, then increased by 20 percentage points to 73% in 2008/2009 but declined slightly to 70% in 2014. Long-term methods share was about 6% in 2003 and 2008/2009, then almost a four-fold increase to 22% in 2014. Use of permanent methods showed a declining trend from 41% in 2003 to 22% in 2008/2009, and to 8% in 2014, an overall decline of about 75%.

For the women with primary education, the use of short-term methods was at 80% in 2003 and 2008/2009, then declined to 71% in 2014. The use of long-term methods took a share of about 6% in 2003 and 20082009, then rose almost four times to reach 22% in 2014. Permanent methods had a share of 13% in 2003 and 2008/2009 but declined by 50% to 7% in 2014.

Modern method users with secondary education had a 70% share of short-term methods in 2003, which increased to 77% in 2008/2009, then declined to 70% in 2014. Share of long-term methods stood at about 20% in 2003, declined to 15% in 2008/2009 and increased by 11 percentage points to 26% in 2014. Permanent methods had shares of 11%, 8% and 4% progressively from 2003 to 2014, showing an overall decline of about 60% during the study period.

5.6 Residence and Method Choice

Residence was also significantly associated with method choice. Rural modern method users gave short-term methods with 74% share in 2003 and 79% in 2008/2009, then declined to 71% in 2014. Long-term methods had 11% share in 2003 and 7% in 2008/2009, after which their share tripled to 22% in 2014. Permanent methods had about 15% share in both 2003 and 2008/2009, which declined by half to 7% in 2014.

For urban users, short-term method use was at 75% and 79% respectively in 2003 and 2008/2009, then declined to 69% in 2014, thus recording a decline of 10 percentage points between 2008/2009 and 2014. Long-term method users took 65% and 70% in 2003 and 2008/2009 respectively, then the figure rose by 6 percentage points to 77% in 2014. Permanent methods had shares of 11%, 7% and 4% in 2003, 2008/2009 and 2014, showing a consistent decline of about 40% between surveys.

5.7 Wealth and Method Choice

This variable was also significantly associated with method choice. Users from the lower wealth category had 83% share of short-term methods in 2003 and 2008/2009 then the share reduced to 73% in 2014. Long-term methods were at about 5% in both 2003 and 2008/2009 but significantly rose to 20% in 2014. The share of permanent methods was about 13% in both 2003 and 2008/2009, then dropped by half to 7% in 2014.

For users in the middle wealth quintile, short-term methods took a share of between 77% and 80% in 2003 and 2008/2009, which then declined significantly to 71% in 2014. Long-term methods had about 8% share in both 2003 and 2008/2009, which almost tripled to 22% in 2014. Use of permanent methods was at 14% in both 2003 and 2008/2009, then declined by half to 7% in 2014.

The higher wealth quintile gave short-term methods about 71% share in 2003, 78% in 2008/2009 and a reduced share of 68% in 2014. Long-term methods took about 15% share in both 2003 and 2008/2009, then a much-increased share of 27% in 2014. Permanent methods had 13%, 9% and 5% respectively for 2003, 2008/2009 and 2014.

5.8 Region and Method Choice

Region also emerged as significantly associated with method choice in 2003 and 2008/2009. Users in regions of lower contraceptive use gave short-term methods a share of 73% in 2003 and 78% in 2008/2009 but the share reduced to 70% in 2014. The share of long-term methods

for the group was 13% in 2003, slightly declined to 10% in 2008/09, then registered a 2.5 times upsurge to reach 24% in 2014, showing a near doubling of the share between 2003 and 2014. Permanent methods had an average share of about 15% in 2003 and 2008/2009, then the share reduced by half to 7% in 2014.

For users in regions of higher contraceptive use, short-term methods had a share of about 79%, 84% and 71% respectively across the datasets. Long-term method share was 10 % in both 2003 and 2008/2009 then more than doubled to reach 23% in 2014. Permanent methods had a share of 11% in 2003, which reduced to about 7% in both 2008/2009 and 2014.

5.9 Marital Status and Method Choice

The variable was associated with method choice in all the datasets. Use of short-term methods among married women was seen to increase its share from 72% to 78% between 2003 and 2008/2009, then it declined to 70% in 2014. Among the not married women, the share moved from about 85% in both 2003 and 2008/2009 to 75% in 2014, a decline of 10 percentage points.

The share of long-term methods among married women moved from 7% (2003) to 11% in 2008/2009 and to 24% in 2014, a more than three-fold increase. Among the not married, it moved from 7% to 6% to 20% in 2003, 2008/2009 and 2014 respectively, again a three-fold upsurge.

Among married women, permanent methods had a 14% share in 2003, which declined to 11% in 2008/2009 and to 6% in 2014 to give an overall decline of about 60%. Among the not married, the share increased slightly from 8% to 10% between 2003 and 2008/2009, then declined by half to 5% in 2014.

5.10   Multinomial Regression Results

To measure the strength of the association identified in the chi square tests between the independent variables and method choice, multinomial regression was conducted against the selected variables and the current method (outcome variable). The aim was to analyse the individual effects of the socio-demographic variables on the choice of method.

Permanent methods were used as the reference category, hence the results presented in Table 5.3 show the direction of the association between each socio-demographic variable and short-term or long-term methods relative to permanent methods.

Table 5.3: Multinomial regression results of contraceptive method choice for all women of reproductive age in Kenya, 2003-2014

Year/Variable	Short-term vs Permanent			Long-term vs Permanent		
2003	**B**	**S.E**	**Exp B**	**B**	**S.E**	**Exp B**
Age						
15-24	5.156	.995	173.421***	3.585	1.025	36.040***
25-34	2.383	.208	10.834***	1.696	.246	5.454***
35-49 **(ref)**	.000		1.000	.000		1.000
Education						
None	-1.059	.308	.347**	-2.133	.583	.119***
Pry	-.282	.179	.754	-1.157	.222	.315***
Sec+ **(ref)**	.000		1.000	.000		1.000
Residence						
Rural	.427	.208	1.533*	.366	.241	1.442
Urban **(ref)**	.000		1.000	.000		1.000
Wealth						
Lower	.660	.226	1.934**	-.297	.318	.743
Middle	.242	.218	1.274	-.500	.303	.606
Higher **(ref)**	.000		1.000	.000		1.000
Region						
Low Contraceptive	-.544	.189	.580**	-.252	.242	.777
High Contraceptive	.000		1.000	.000		1.000
Marital status						
Married/Living together	-.297	.256	.743	.046	.325	1.047
Not married **(ref)**	.000		1.000	.000		1.000
	Short-term vs Permanent			**Long-term vs Permanent**		
2008/09	**B**	**S.E**	**Exp B**	**B**	**S.E**	**Exp B**
Age						
15-24	5.962	1.416	388.503***	4.040	1.452	56.828**
25-34	1.905	.163	6.719***	1.438	.217	4.211***
35-49 **(ref)**	.000		1.000	.000		1.000
Education						
None	-.760	.340	.468	-1.783	.753	.168*
Pry	-.411	.166	.663*	-1.074	.221	.342***
Sec+ **(ref)**	.000		1.000	.000		1.000
Residence						
Rural	.592	.214	1.808**	.623	.259	1.865*
Urban **(ref)**	.000		1.000	.000		1.000
Wealth						
Lower	.156	.197	1.169	-1.053	.349	.349**
Middle	.110	.189	1.117	-.322	.276	.725
Higher **(ref)**	.000		1.000	.000		1.000
Region						
Low Contraceptive	-.813	.186	.444***	-.477	.254	.621
High Contraceptive **(ref)**	.000		1.000	.000		1.000
Marital status						
Married/Living together	-.154	.217	.857	.172	.306	1.188
Not married **(ref)**	.000		1.000	.000		1.000
	Short-term vs Permanent			**Long-term vs Permanent**		
2014	**B**	**S.E**	**Exp B**	**B**	**S.E**	**Exp B**
Age						
15-24	5.273	.631	194.933***	4.838	.632	126.178***
25-34	2.090	.106	8.082***	2.053	.112	7.788***
35-49 **(ref)**	.000		1.000	.000		1.000
Education						
None	-.724	.216	.485**	-.707	.237	.493**
Pry	-.501	.100	.606***	-.544	.105	.580***
Sec+ **(ref)**	.000		1.000	.000		1.000

Residence						
Rural	.251	.103	1.286*	.508	.109	1.662***
Urban (ref)	.000		1.000	.000		1.000
Wealth						
Lower	-.066	.113	.936	-.288	.121	.750*
Middle	-.150	.113	.861	-.296	.121	.744*
Higher (ref)	.000		1.000	.000		1.000
Region						
Low Contraceptive	-.224	.086	.799**	-.020	.091	.980
High Contraceptive (ref)	.000		1.000	.000		1.000
Marital status						
Married/Living together	-.042	.118	.959	.211	.126	1.235
Not married (ref)	.000		1.000	.000		1.000
Model	**2003**			**2008/09**		**2014**
-2 Log Likelihood π^2	446.625			456.851		1357.432
Model X^2	475.001			471.930		1169.975
Goodness of Fit	.005			.047		.000

Notes: P-value = 0.05   P<0.05*   P< 0.01**   P<0.001 ***   Ref = Reference Category

Source: Further analysis of KDHS data

The regression results presented here are discussed individually by year. This is meant to identify which of the socio-demographic factors are important predictors of contraceptive method choice in particular years and to observe if there is any change in the determinants over the study period.

5.11   Determinants of Contraceptive Method Choice in 2003

Age

This variable emerged as a very strong and most consistent determinant of contraceptive method choice in 2003 for short-term and long-term methods in comparison with permanent methods for all age categories. The reference group was the 35 to 49 age category.

As expected, women in the 15 to 24 age category were found to have extremely high odds of choosing short-term methods compared to the reference group. The 15-24 age group consists of mostly nulliparous and unmarried young women wanting to delay pregnancy, hence short-term methods are the ideal choice for them. The group had 173 times more likelihood of choosing SACs than the 35 to 49 age group. The group also showed very high odds of choosing long-term methods compared to the 35 to 49 age group. Young women aged 15 to 24 years had 36 times more likelihood of choosing long-term methods compared to the reference group. Thus, the group was shown to lean heavily towards short-term methods than long-term ones.

For the 25 to 34 age category, the odds of choosing short-term methods relative to the women aged 35 to 49 were considerably lower than for the 15 to 24 age cohort. Women aged 25 to 34 years had 11 times more likelihood of choosing SACs than their older counterparts. Again, this

was as expected, considering that the reproductive goals of the group are mostly about spacing children. The 25 to 34 age group were five (5) times more likely to choose long-term methods than the 35+ older women. The fertility intentions of the 35 to 49 age group are mostly about limiting births; hence the result is as expected.

Age also emerged as a very strong predictor in the bivariate regression analysis for both age categories and in both choice of short-term and long-term methods. For the age 15-24 category, the results were as follows: short-term (P=.000), and long-term (P=.000). Results for the 25-34 category were short-term (P=.000), and long-term (P=.000).

Education

Education emerged as a moderately significant correlate of method choice for short-term methods and a very strong predictor for long-term methods in comparison with permanent methods for its different categories. Women with secondary education were the reference group. Education was seen to have a negative relationship with method choice.

Women with no education were found to have lower odds of choosing short-term methods when compared to the more educated women with secondary education. The former had 65% less odds of choosing a SAC method than those with secondary education. Similarly, the women with no education had lower odds of choosing long-term methods than the women with secondary education or beyond. The ones with no education were about 90% less likely to choose long-term methods than the secondary educated ones. Consequently, women with no education were not as likely to choose SAC or long-term contraception relative to the women with secondary education.

Women with primary education had higher odds of choosing short-term methods of contraception than the ones with no education. The former was 25% less likely to choose short-term methods and had about 70% reduction in the odds of choosing long-term contraception when compared with the reference group.

These results on education are as expected because education exposes women to more information and experimentation about the different options on contraception. Education exhibited very strong results in the bivariate regression analysis too. Women with no education had the following results: short-term (P=.000), and long-term (P=.000), while primary educated women had, long-term (P=.000). There was no significance seen for long-term methods in the primary educated group.

Residence

On residence, rural contraceptive users had 1.5 times more likelihood of choosing short-term contraception in comparison with their urban colleagues. The variable showed no significance in the choice of long-term methods in 2003. Bivariate regression analysis showed influence as follows: short-term (P=.004), and long-term (P=.000).

Wealth

Wealth recorded moderate significance in the choice of short-term methods for lower wealth users relative to permanent methods. The reference category was higher wealth status.

Modern method users of lower wealth status had much higher odds of choosing short-term methods than their counterparts of higher wealth status. The former had double likelihood of choosing short-term contraception. Thus, in general, women from lower wealth status were more inclined towards SACs rather than permanent methods when viewed against women of higher wealth. The variable did not show influence over long-term methods.

The influence of wealth in the bivariate regression analysis was very strong, but only for long-term methods. For women of lower wealth status, P-values were: long-term (P=.000) and for those of middle wealth, long-term (P=.000).

Region

Region showed moderate significance in the choice of short-term methods. Higher contraception region was used as the reference group.

Women from regions of lower contraception registered lower odds of choosing short-term methods than their counterparts from regions of higher contraceptive use. Those from regions of lower contraception had 42% less likelihood of choosing short-term contraception than women living in regions of higher contraception. The result is as expected, since regions of lower contraceptive use have less advantage towards contraception in terms of access, information, method mix and service provision.

The variable showed no significance in the bivariate regression analysis.

5.12   Determinants of Contraceptive Method Choice in 2008/2009

Age

Once more age emerged as a very strong correlate of method choice in all its categories and in the choice of both short-term and long-term methods in 2008/2009. Women aged 35 to 49 years were used as the reference category.

In the age category of 15 to 24 years, age showed very strong influence on method choice. The group had 388 times more likelihood of choosing short-term contraception than the 35 to 49 age group. Use of short-term methods is normally high in the 15 to 24 age group because they are mostly unmarried and sexual activity is many times spontaneous. Thus, contraception is for preventing/delaying pregnancies. In the choice of long-term methods, age also showed very strong explanatory influence, with the youngest age group of women being 57 times more likely to choose long-term methods than the older 35 to 49 group. Thus, the odds of choosing short-term methods for the group were higher than those of choosing long-term methods.

Age was also very significant in predicting method choice in the 25 to 34 age category. There was an almost seven-fold increase in the odds of choosing a short-term method for the group relative to the 35 plus group. The odds of choosing a long-term contraceptive for the group increased almost four (4) times in comparison with the older group aged 35 to 49.

The bivariate regression analysis results also found age a strong influence in the choice of contraceptive method. Findings for the 15-24 age group were; short term (P=.000), long term (P=.006) while for 25-34 age group, they were; short term (P=.000) and long term (P=.000).

Education
The influence of education varied from weak to very strong as a significant explanatory variable for method choice in 2008/2009, with the reference category being women with secondary education.

The results for short-term methods had education as slightly significant in explaining method choice for users with primary level education. They showed women who had attained primary education as 34% less likely to opt for a short-term method than their secondary educated colleagues. This translates to women who had attained secondary education as using short-term contraception more than their counterparts with primary education. On long-term methods, women with no education were about 83% less likely to choose them, while women with primary education had 66% less likelihood of choosing long-term contraception than their fellow secondary educated women. Therefore, secondary educated women had more likelihood of choosing long-term methods than women with no education or with primary education. The influence was very strong for those with primary education.

Bivariate regression results for education showed mixed strength with P-values for no education being: short-term (P=.000) and long-term (P=.001), and for primary education short-term (P=.014) and long-term (P=.000).

Residence

Place of residence showed moderate significance in the choice of short-term methods and weak influence for long-term methods. The reference category was urban.

For short-term methods, women from the rural areas were 1.8 times more likely than those in urban areas to choose a short-term method. This inclination suggested that the use of short-term methods was more prevalent in the rural than in urban areas. It was expected because the rural areas have some challenges of accessing family planning services. Women in the rural areas tend to go for convenient short-term methods such as the injection, which do not require frequent visits to the health facilities. On the use of long-term methods, women from the rural areas had 1.8 times more odds of choosing them when compared with their urban counterparts. Thus, in general, rural women were equally more likely to opt for both short-term and long-term methods than their urban counterparts. Residence had P=.000 in bivariate regression for rural residents in both short-term and long-term methods.

Wealth

The variable showed moderate correlation in the choice of long-term methods for women from lower wealth status. They were about 65% less likely to choose long-term methods than their higher wealth colleagues.

Bivariate regression results showed influence of wealth on users of lower wealth in the use of long-term methods (P=.000). For women of middle wealth, influence was short-term (P=.007) and long-term (P=.000).

Region

Region was very significant in explaining method choice but specifically the use of short-term methods. A 56% decline in the odds of choosing a short-term method for women living in regions of lower contraception over those from the regions of higher contraceptive use was noted. Thus, women from low contraceptive use regions were less inclined to choose a short-term contraception as their colleagues in the higher contraceptive regions. The variable was also significant in bivariate regression, with short-term P=.001 for users in low contraceptive regions.

5.13   Determinants of Contraceptive Method Choice in 2014

Age

Age was shown as a very strong predictor of contraceptive method choice in 2014 in all age categories for both short-term and long-term methods.

The 15 to 24 age group had 195 times increase in odds of choosing a short-term method compared to the reference group of users aged 35 to 49 years. This means that the use of short-term methods was much more prevalent among the women aged 15 to 24 than among their 35 to 49-year-old colleagues. Similarly, the 15 to 24 age group was more prone to choosing long-term methods than the older group of 35 to 49 years. They were 126 times more likely to choose long-term methods than the 35 to 49 users. This suggests that the use of both short-term and long-term methods was higher among the 15 to 24-year-olds than in the women users aged 35 to 49.

Results for the 25 to 34 age category showed the group had about eight (8) times more likelihood of choosing short-term methods in comparison with the 35 to 49 age group. For long-term methods, the odds of choosing a long-term method rose almost eight-fold for the younger group compared to the older group. This means that the younger category was almost eight (8) times more likely to use long-term methods than the 35 to 49-year-old women.

In the bivariate regression, age exhibited the strong influence seen in the multivariate regression. P-values were as follows: 15-24 short-term (P=.000), long-term (P=.000) and for 25-34 short-term (P=.000), long term (P=.000).

Education
Education was an important predictor of mixed significance during the year. Women with no education were 52% less likely to choose a short-term method compared to those with secondary education. They were also 51% less likely to choose long-term methods in comparison with the secondary educated women.

Women with primary education emerged with 40% less likelihood of choosing a short-term method than the more educated reference group with at least secondary education. There was a 42% fall in the odds of using a long-term method for the primary educated group compared to secondary educated users.

Bivariate regression results gave P-values as follows: for no education, short-term (P=.000) and long-term (P=.000). Similarly, for women with primary education, short-term was P=.000 and long-term P=.000.

Residence
Residence emerged as a weaker influence in the choice of short-term methods and very significant in choice of long-term methods. Rural women were 1.3 times more likely to choose short-term methods relative to women in urban areas. They were also 1.7 times more likely to

choose long-term methods compared to urban women. Thus, the results suggest higher odds of choosing both short-term and long-term methods for rural over urban women.

In the bivariate regression, the variable showed strong influence, with P=.000 for both short-term and long-term methods.

Wealth

Wealth took a negative direction in terms of significance in predicting the choice of long-term methods. Women in the lower wealth category had 25% less likelihood of choosing a long-term method relative to the higher wealth category group. Women from households of middle wealth status were also 26% less likely to opt for long-term contraception compared to those from households of higher wealth status. The variable thus showed equal influence over both women of the lower and middle wealth category in their choice of long-term methods but no significance in the choice of short-term methods.

Bivariate results showed very strong influence of wealth on both short-term and long-term methods in both categories of lower and middle wealth. The result was P=000 for each method type in each category of wealth.

Region

Region recorded moderate influence on the choice of short-term contraception but no significance in the choice of long-term methods. Women from regions of lower contraceptive use were 20% less likely to choose a short-term method in comparison to the women from higher contraceptive use regions. Thus, the use of short-term methods was much higher in high contraception use regions than in those of lower contraception. This is as expected since regions of lower contraceptive use are disadvantaged in terms of contraceptive use information, exposure, method mix and service provision, and therefore use.

Bivariate regression results showed influence in the use of short-term methods for regions of lower contraceptive use with P=0.10.

Marital Status

The regression analysis was also done for each data set while controlling for the not married/not living together part of the sample. The variables that showed significance for short-term methods were: 2003 (residence, age, wealth and region), 2008/2009 (residence, age, education and region) and for 2014 (residence, age, education and region). Thus, education was not a significant influence in 2003, while wealth did not show significance in 2008/2009 and 2014.

For long-term methods, the significant predictors with control for not married/not living together were as follows: 2003 (age, education, region, residence and wealth), 2008/2009 and 2014 (residence, age, wealth and education). Therefore, the effect of region was overshadowed by the effect of the marital status in 2008/2009 and 2014.

5.14 Overall Determinants of Contraceptive Method Choice

All the selected socio-demographic factors of age, education, residence, region and wealth emerged as significant explanatory variables for contraceptive method choice but with varying degrees of influence. However, their influence was best depicted in the 2014 dataset.

For short-term methods, the consistent determinants were age, education, residence and region for the three datasets, while wealth was significant for only the 2008/2009 dataset. Age was consistently a very strong positive predictor across the three datasets for all its categories. Education had mostly moderate or very strong influence over choice of short-term methods. Residence, wealth and region had a variety of low, moderate or very strong effects on choice of short-term methods of contraception. Region exhibited moderate influence in 2003 and 2008/2009 but very strong influence in 2014.

Determinants of long-term methods emerged as age and education across all datasets, while residence and wealth had influence in 2003 and 2014. Influence of age and education was strong while for residence and wealth it varied from weak to moderate to strong.

Marital status did not show any significance in any dataset for either short-term or long-term methods in the multivariate regression but showed significance for short-term methods in all the surveys in the bivariate analysis. Results were: 2003 (P=.002), 2008/2009 (P=.007) and 2014 (P=.001).

5.15 Discussion

Overall, results showed a clear dominance and rise in the use of long-term methods, with their share increasing by 100% over the study period. Use of short-term methods was on a gradual decline from 2003 and by 2014 had lost about a sizeable share. However, the biggest change was between 2008/2009 and 2014 when the use of long-term methods rose by 150% and the use of permanent methods fell by over 50%. Similar results have been reported for Kenya recently (Kungu et al, 2020a; Jacobstein, 2018; Jacobstein and Polis, 2014). The rise in the use of long-term methods can be associated with the government's initiatives to improve access to information and contraception services countrywide through sustained national campaigns and

the FP2020 campaigns (Askew, 2009; Crichton, 2008). Ghana has experienced similar results recently, attributed to government initiatives (Novignon and Novignon, 2014).

Share of permanent methods showed consistent decline across the socio-demographic variables, mostly between 2008/2009 and 2014, a trend identified in Kenya from the 1990s (Magadi et al, 2001). An interesting finding was that permanent methods were losing to long-term methods even for the 35 to 49 age group. These are the traditional consumers of the methods, as they have most likely attained their fertility desires and hence are limiting births. Their share of permanent methods reduced by half from 31% to 15% over the study period. This loss translated to a gain for the long-term methods, which are reversible and offer a wide range of non-contraceptive benefits to the older women (Joshi et al, 2015; Kavanaugh and Anderson, 2013).

Another group that had a big share of permanent methods were users with no education at 41% in 2003. However, major declines reduced the share between 2003 and 2008/2009 to 22% and by almost two-thirds between 2008/2009 and 2014 to 8%. Permanent methods are generally not very popular in sub-Saharan Africa and their use has been declining but increased uptake has been recently reported in Malawi and Uganda (UN, 2018; Lutalo et al, 2015).

Age emerged as the strongest and most consistent determinant of contraceptive choice. Contraceptive use normally rises with age but later falls with advanced age. Confirming this trend, the findings showed that the use of short-term methods was more in the lowest age category of 15-24 relative to the older age groups in all the datasets and more use of short-term methods in the 25-34 age category compared to the 35-49 age group.

Use of long-term methods was more in the 15-24 and 25-34 age groups than in the 35-49 age group. In general, there was more use of modern methods (both short-term and long-term) in the 25-34 category of women than in the older 35-49 age group. The 25-34 age group is traditionally the biggest user of contraception because of its huge numbers and high demand for spacing.

These results were in conformity with the established fact that fecundity declines with advancing age and are consistent with other studies in Kenya and elsewhere (Bbaale and Mpuga, 2011; Magadi et al, 2001)

Education also emerged as a strong predictor of contraceptive choice. It showed a negative relationship with method choice over the study years. Its effects were more prominent in contraceptive users with primary education. Female education has been a long-standing

determinant of contraceptive choice in Kenya and elsewhere, with contraceptive use expected to increase with increasing levels of education (Hembah-Hilekaan et al, 2018; Kimani et al, 2013; NCPD, 2012b). However, the education level of a woman has also shown a mixed relationship on the choice of modern contraception. For women with lower education, the relationship is normally positive, but it turns negative for women with higher education (Solanke, 2017). As seen in this study, results for 2008/2009 for long-term methods, sometimes education has shown no influence on contraceptive choice in Kenya, as reported by Larsson and Stanfors, (2014). Also seen in the study was the increasing preference for short-term methods among secondary educated women. The women are expected to have better information, exposure and access to contraception and may be experimenting with different methods or they could be getting married and having children later hence using short-term methods to delay pregnancy (Sonfield et al, 2013). Another reason could be fear of side effects as was found in a recent study in Nigeria (Ajayi et al, 2018).

As expected, results showed that women who had attained secondary education had more odds of choosing both short-term and long-term methods of contraception than those with less education. As contraceptive use increased with higher education, primary educated women were found less likely to choose both short-term and long-term contraceptive methods than their secondary educated counterparts. Magadi and Curtis, (2003) similarly reported this finding, while Oketch et al, (2011), in a departure from the common findings, reported that a woman's education status in Kenya negatively influenced the use of contraception.

Findings showed increasing association between residence and contraceptive use, especially for long-term methods. There was preference for short-term methods, which most likely were injections in rural areas, where users might want to minimise trips to health facilities. However, there was also increasing significance for long-term methods from 2008/2009 to 2014, suggesting that the rural women were getting more exposed to contraception information, services and a wider method mix. Magadi and Curtis, (2003) had found no significance for residence but a narrowing of the gap between urban and rural TFRs recently resulting from major declines in rural TFR was reported by Askew et al, (2016). This can probably be attributed to the work of community health workers (CHWs). Recent findings show that almost 70% of public health facilities are using CHWs to scale up family planning (PMA2020, 2017). Perhaps efforts at closing the long-standing gap in service provision between urban and rural areas are bearing fruit and equity in service provision and access is being achieved.

Obare et al, (2011) also identified residence as a significant factor in contraceptive use in Kenya and Performance Monitoring Accountability (PMA) 2020 has also recently reported more contraceptive prevalence in urban areas than in rural areas in Kenya (PMA 2020, 2017). A weak association was found in Ghana for residence by Novignon and Novignon, (2014). Studies on residence have proposed that high standards of living in urban areas tend to influence couples/individuals towards smaller families, hence more use of contraception has been the norm in urban areas (Kimani et al, 2013).

Wealth was also found to be a predictor of modern contraceptive use in positive and negative directions but showed no effect in 2003 for long-term methods and in 2008/2009 and 2014 for short-term methods. The shift towards long-term methods was more prevalent among women in the lower and middle wealth categories than among those in the higher wealth category. Household wealth is calculated from household possessions and wealth is commonly viewed as a proxy for asset-based poverty and place-based poverty. Most study results in Kenya and other parts of the world find that contraceptive use rises with increase in wealth index from lower to the higher categories (Ochako et al,2016; Novignon and Novignon, 2014; Kimani et al, 2013). The finding on the women of lower wealth status choosing long-term methods more than those from higher wealth categories may be explained by the late adoption of modern methods of contraception due to previous challenges in accessing contraceptive information and services (Askew et al, 2016).

Region was another correlate of contraceptive choice identified in the study, with moderate or very strong influence for short-term methods but no influence on long-term methods. Variations in choice were seen in the two types of regions, with regions of high contraceptive use initially dominating in the use of long-term methods. However, regions of lower contraceptive use consequently overwhelmingly improved in use. Regions of higher contraceptive use have been traditionally wealthier. However, with devolution enabling wealth creation in the counties and improved service provision, regional disparities might be minimised. Regions of high contraception have lower numbers of population in the lower wealth quintiles, while those of lower contraception have higher numbers in lower wealth categories. The major disparities in choice of contraception favour regions of lower contraception. The phenomenal increase in users living in regions of lower contraceptive use by 150% over the study period suggests the success of family planning scale-up campaigns by the Ministry of Health and FP2020 targeting rural, marginalised and hard to reach areas

(PMA2020, 2017). The regional disparities have always existed because information and service provision in regions varies (Kimani et al, 2013; NCPD, 2012b).

5.16 Summary of Results

As reported in the previous chapter that presents a trend analysis, the contraceptive use pattern showed a shift from short-term methods towards long-term methods which are known to be more convenient, effective and come with greater user satisfaction. This was seen very prominently in the 15-24 age group, which had registered an almost three-fold increase (Kungu et al, 2020b). Permanent methods were on a decline across all the socio-demographic variables.

There was not much change seen in the contraceptive uptake between 2003 and 2008/2009 but a phenomenal increase occurred between 2008 and 2014. The findings present a profile of the majority of modern contraceptive users being in the 25-34 age category, living in rural areas, having primary education and living in regions of lower contraceptive use. All the socio-demographic variables in the study exhibited influence over method choice.

The results reinforce the findings of previous national and regional studies in Kenya but also bring out emerging issues from the sustained national family planning campaigns for increased mCPR and LARC use.

CHAPTER 6

FACTORS ASSOCIATED WITH CONTRACEPTIVE DISCONTINUATION

6.1 Introduction

Studies on discontinuation are important for managers of family planning programmes and policy makers as they may point to several problems within those programmes. Method specific discontinuation rates from side effects may suggest problems in the information and counselling given while initiating or following up on a method. High or low switching between methods may imply dissatisfaction with the methods or availability/lack of a good method choice and convenient access. Discontinuation attributed to failure may indicate incorrect use of a method, while high rates of discontinuation for reasons of access and/or availability may imply challenges in supply and distribution of contraceptives or inadequate service delivery (Ali and Cleland 1999; Ali and Cleland 1995; Curtis et al 1997). Mostly, discontinuation is a result of reasons other than desire for a child, hence can be termed premature (Ali et al, 2012).

The KDHS 2014 found discontinuation rates to be high at 31% within 12 months of initiating contraception. Of great concern are users who discontinue while they still need to prevent pregnancy. They heighten the risk of unplanned pregnancies and unplanned fertility, which has repercussions for the family and country (KNBS, 2010). It is therefore very important to establish the factors that drive discontinuation so that they can be addressed where possible and for the high rates of discontinuation to be minimized.

The issue of contraceptive method mix was of interest in the study because of the close association between discontinuation and method choice. Studies on discontinuation have strongly associated contraceptive method choice with three different types of discontinuations: abandonment while in need, method failure and switching (Ali and Cleland, 2010). Abandonment while in need refers to users who stop using a method while they do not want to get pregnant and method failure happens when a woman gets pregnant while using a specific method. Switching occurs when a user discontinues one method and soon after initiates another one. For this study, method failure was combined with discontinuation when not in need to form a category of 'other', because such a user has neither abandoned nor switched.

This chapter focused on the third study objective 'to examine the factors associated with contraceptive discontinuation'. The period of focus was a three-year span (36 months) before the KDHS interview using the KDHS 2014 dataset. The unit of analysis was an episode of contraceptive use. The study also analysed discontinuation for the major modern methods:

injection, pill, implants and IUDs. It also analysed the socio-demographic variables of education, age, place of residence, wealth status and contraceptive use region.

The study focus was to establish the extent to which there exists a link between method choice and discontinuation.

6.2 Discontinuation Episodes by Type of Discontinuation

The first stage of analysis identified the distribution of the discontinuation episodes according to the three study categories of discontinuation types. Figure 6.1 presents the results of the distribution.

Figure 6.1: Distribution of discontinuation episodes by type
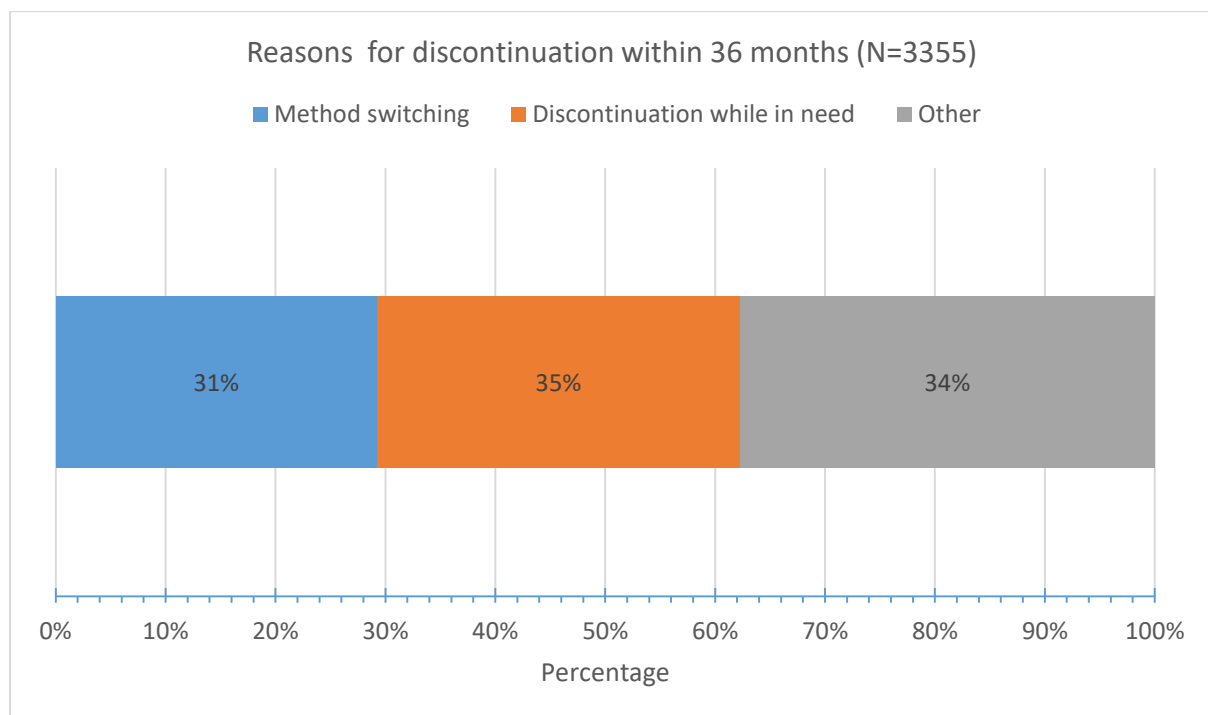
Note: Other = discontinuation for no need and method failure

Data in the above table indicate that there was no real significant difference between the discontinuation episodes. However, those who discontinued while still in need constituted 35% of the episodes, while the other category was 34% and those who switched methods accounted for 31%.

6.3 Overall Discontinuation Rates

The overall discontinuation rates were calculated at 12-month intervals from 12 to 36 months and the results are shown in Table 6.1. The rates were obtained by dividing the episodes of discontinuation in a particular month by the total episodes that lasted for each time duration.

Table 6.1: Overall discontinuation rates for 12, 24 and 36 months

Method	12 – month discontinuation rates Percent	24 – month discontinuation rates Percent	36 – month discontinuation rates Percent	Number of episodes Episodes
Pill	18	18	46	973
IUD	8	15	36	86
Injectable	15	30	42	2,058
Implant	12	25	42	238
All Methods	**30**	**37**	**74**	**3,355**

The obtained rates of discontinuation at 12 months were 30%, for 24 months 37% and, for 36 months 74%. The pill led at 12 months and 36 months while the injection led at 24 months. Rates for all methods were high at 36 months. IUDs had the lowest rates across the time durations.

6.4 Distribution of Discontinuation Episodes by Method and Background Characteristics

The next stage of analysis categorized the episodes of discontinuation by method used and the selected socio-demographic variables. Table 6.2 shows the obtained frequencies.

Table 6.2: Distribution of discontinuation episodes by contraceptive method and variable for 36 months of contraceptive use

Variable	36 months N=3355
Method	
Pill	29
IUD	3
Injection	61
Implants	7
Age	
15-24	20
25-34	54
35-49	26
Education	
None	61
Pri	29
Sec +	10
Residence	
Rural	58
Urban	42
Wealth status	
Lower	31
Middle	23
Higher	46
Region	
Low Contraceptive	28
High Contraceptive	72

As expected, discontinuation episodes varied by contraceptive method. The distribution of discontinuation episodes by the type of method showed injection was leading with 61% of the episodes followed by the pill with 29% of the episodes. The two methods took up a combined total of 90% of the episodes, showing that discontinuation is very prevalent among their users. Implants had 7% of the episodes, while IUD had 3% only hence discontinuation was lower among these methods.

On the variables for age, the category with more than half of discontinuation episodes was the 25-34 age group with 54% followed by the 35-49 age group with 26%. The 15-24 age group had the least episodes at 20%. On education, more than half of the episodes (61%) were under the "none" category, while the primary category had 29%. The two categories took up 90% of the episodes. Episodes for secondary category were at 10%, the lowest.

Women residing in the rural areas exhibited higher episodes of discontinuation than those residing in urban areas. It was also observed that women in the higher wealth category had most episodes of discontinuation at 46% followed by the lower category at 31% and the middle category at 23%. Further, the results indicated that those in the higher contraceptive regions had the highest episodes of discontinuation at 72%. The main reasons for discontinuation are shown in Figure 6.2.

Figure 6.2: Percent distribution of discontinuations within 36 months preceding the survey by the main reasons for discontinuation, Kenya 2014
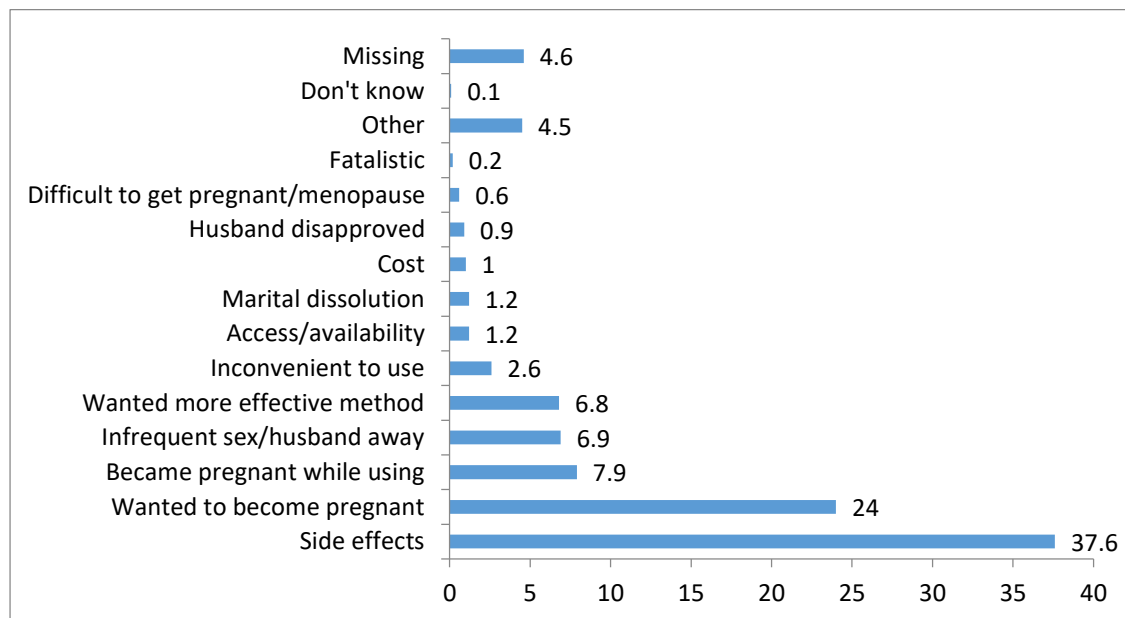
The figure shows the main reasons given by women for discontinuation of contraception. Side effects took the lead at nearly 38% followed by wanting to get pregnant at 24%. Method failure

took 8%, while those who discontinued because of infrequent sex or partners being away as well as those who wanted a more effective method had a share of about 7% each.

6.5 Differentials in Discontinuation Types

A cross tabulation of discontinuation types by the different method types and variables was then conducted as presented in Table 6.3.

Table 4.3: Percent distribution of discontinuation types by contraceptive method and variable for 36 months of contraceptive use

Variable	Switching	Discontinuation while in need	Other
Method			
Pill	39	29	32
IUD	42	27	31
Injection	27	38	35
Implants	30	38	32
Age			
15-24	24	39	37
25-34	30	34	36
35-49	38	35	27
Education			
None	31	38	31
Pry	33	32	35
Sec +	30	25	45
Residence			
Rural	32	36	32
Urban	29	34	37
Wealth status			
Lower	21	45	34
Middle	34	35	31
Higher	36	29	35
Region			
Low contraceptive	22	45	33
High contraceptive	34	32	34

Switching

Findings on the types of discontinuation by method revealed that the IUD was the method that took the highest share of switching at 42% followed by the pill at 39%, the implant at 30% and injection at 27%.

On age, women aged over 35 years led in switching at 38% followed by women in the 25-34 age group at 30%, with those in the 15-24 age group trailing at 24%. Education differentials showed women with primary education leading in switching at 33%, while those who had no education and those with secondary education had about 30% share each.

Rural women were slightly ahead at 32%, while their urban counterparts were at 29%. Higher contraceptive regions were at 34%, while the lower contraceptive regions had a 22% share.

Higher wealth category had the bigger share at 36% closely followed by the middle wealth category at 34% and lastly the lower wealth category at 21%.

Discontinuation (Abandonment) While in Need

On abandoning while still in need, the injection led alongside the implant at 38% each, followed by the pill at 29% and the IUD at 27%. The 15-24 age group led in abandoning methods while in need at 39%. The 25-34 age group and the over 35 years old age group were at 34% and 35% respectively. Women with no education contributed the biggest share of abandonment at 38%, followed by those with primary education at 32%. Secondary educated women had the least share at 25%.

Rural women led in abandoning while in need at 36% closely followed by women in urban areas at 34%. Regions of lower contraception led by a considerable margin in abandonment at 45%, while higher contraceptive regions had 32%. Women of lower wealth had the biggest share of abandonment at 45% followed by those of middle wealth at 35% and those of higher wealth at 29%.

6.6 Determinants of Discontinuation

In this stage of analysis, the four selected methods and the five (5) socio-demographic variables were fitted into a Cox regression model to analyse the effects of each variable on discontinuation and identify the determinants. Table 6.4 presents the findings.

Table 6.4: Cox regression - factors influencing discontinuation within 36 months of contraceptive use

	Coefficient	SE	Hazard ratio
Method			
Pill **(Ref)**	.000		
IUD	-.386	.234	.680
Injection	-.213	.057	.808***
Implants	-.537	.113	.585***
Age			
15-24	.198	.079	1.219*
25-34	.016	.072	1.016
35+**(Ref)**	.000		1.000
Education			
None **(Ref)**	.000		1.000
Pry	-.004	.060	.997
Sec+	-.029	.092	.972
Residence			
Urban **(Ref)**	.000		1.000
Rural	.037	.059	1.038
Region			
High Contraception **(Ref)**	.000		1.000
Low Contraception	.020	.059	1.020
Wealth			

Lower **(Ref)**	.000		1.000
Middle	.032	.072	1.033
Higher	-.022	.071	.978
Model Summary			
-2 Log Likelihood		18966.678	
Model X^2		39.466	
Goodness of Fit		.000***	

Notes: P-value = 0.05 P <0.05* P<0 .01** P<0.001 ***   Ref = Reference Category

The regression analysis identified two variables as predictors of discontinuation: method of contraception (injection and implants) and age (15-24). Injection emerged as a very strong predictor of discontinuation. The results showed a 20% decrease in the hazard of discontinuing the injection compared to the pill. Injection users were 20% less likely to discontinue than pill users. This is because injection, in spite of being short-term, are more convenient to use. They do not depend on the user and have much lower discontinuation rates than the pill. The other method that exhibited very strong predictive ability on discontinuation was the implants. Implant users were 42% less likely to discontinue than pill users. The results showed that women using injectables and implants were less likely to discontinue compared to women using the pill. This is probably because of the likelihood of missing to take the pill and becoming pregnant. Injectables and implants have no such risks as they are long lasting and are not user dependent. Injections and implants are currently the leading methods of contraception in Kenya in that order. The IUD did not show any significance in predicting discontinuation, possibly because its use is much lower.

For age, significance emerged in the 15-24 age category only. Those aged 15-24 were 1.2 times more likely to discontinue compared to those aged 35+ years. The group thus had a 20% increase in the hazard of discontinuing a method compared to the older 35+ category. This is as expected because the younger women are mostly initiating contraception and are therefore still experimenting with methods.

6.7 Survival and Hazard Functions at Mean of Covariates

There are two key functions in survival (event history) analysis such as for discontinuation. The first one is the hazard or distribution function, which is the potential per unit time to discontinue a method in the next episode. It shows the event of focus, that is the risk of discontinuation.

The opposite is the survival function that shows the probabilities of survival, the aspect of not experiencing discontinuation or the proportion of users who continue to use the method. The two functions are shown in Figure 6.3 and Figure 6.4.

111

Figure 6.3: Survival function at mean of covariates
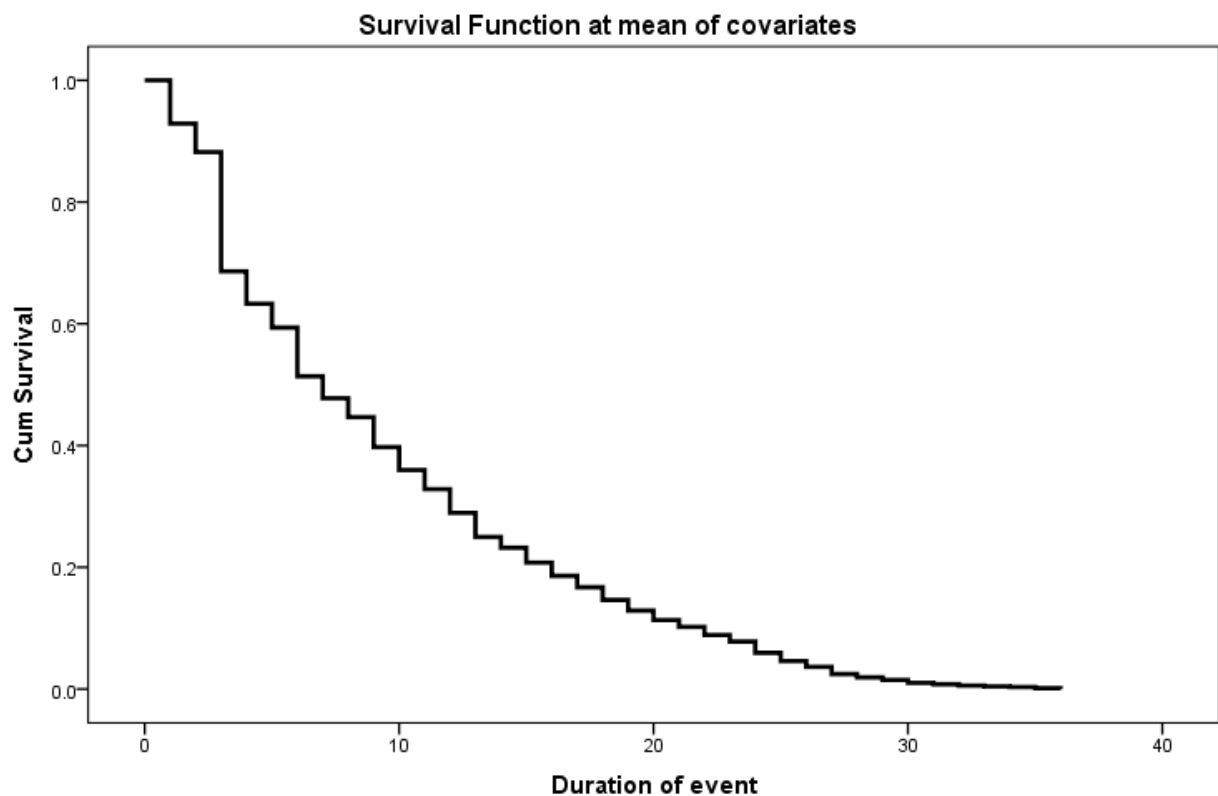
The survival function indicates the probability that the event of interest (discontinuation of use) has not yet occurred by a certain time t (duration of use). Thus, if t denotes the duration of use before discontinuation, the cumulative survival function at the mean indicates the probability of survival or continuation of use beyond that time. The illustration above indicates that the probability of continuing to use at any point in time is a logarithmic decay (rate of decrease decreases until it gets to zero). As shown here, the probabilities of occurrence at given months are 6 (50%), 12 (35%), 24 (10%) and 36 (0%).

Since for this specific study, the cases selected and included in the model are those that all had a date of beginning and a date of termination of contraceptive use, at the beginning the probability is 1. The exhibit is a logarithmic decay to the maximum period of 36 months, where the probability of survival of use for any specific modern contraceptive method is zero.

Figure 6.4: Hazard function at mean of covariates
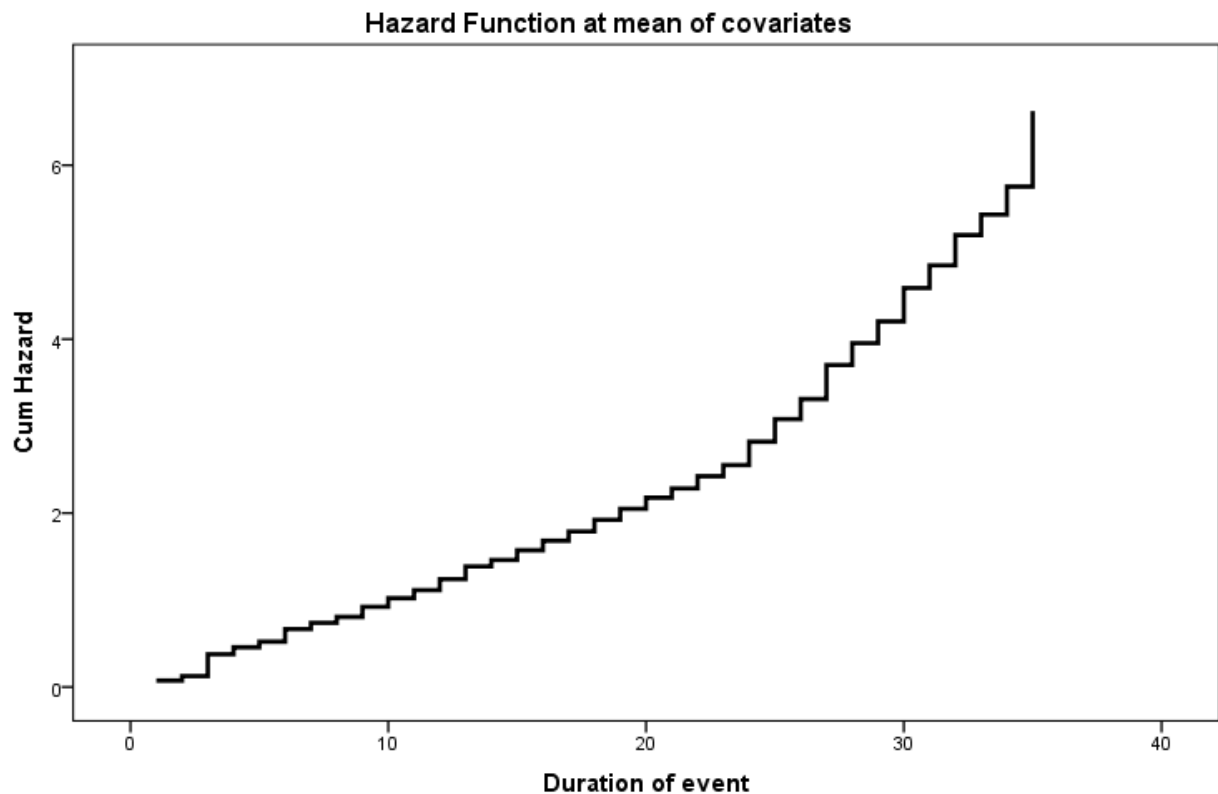
The figure presents the opposite scenario of the survival function. The hazard function being a conditional density indicates that the risk of failure (the discontinuation of contraceptive use) is exponentially increasing with time from the start time to the end time of 36 months. The cumulative hazards shown in months of duration are as follows; 6 (below 10%), 12 (slightly above 10%), 24 (about 25%) and from that point it surges to 70% for 36 months of use.

6.8 Discussion

The overall rates of discontinuation of 30%, 37% and 74% for 12, 24 and 36 months respectively, as well as the method specific rates observed in the study were consistent with other studies. The rates for all methods were high at 36 months, which may signal spacers discontinuing because of desire for pregnancy. Overall and method specific discontinuation rates comparable to the results of this study were reported for KDHS 2003 data (Ali et al, 2012, Agwanda, 2005) and KDHS 2014 data (Ontiri et al, 2020).

The rates of switching at an overall of 31% seen here are consistent with other studies and emphasize that discontinuation is not necessarily negative. Some women may discontinue certain methods because of side effects, difficulty in use or inconvenience to them and their partners but switch to more suitable or effective methods (Castle and Askew, 2015; Ross et al,

2015). Switching according to different variables is also consistent at around 30%, with minimal variations. Ali et al, (2012) found switching rates of 40% at 36 months of use.

However, it is not always the case that those who switch move to more effective methods. Ali et al, (2014) found that about 50% of women who discontinue switch to other modern methods, while about 12% initiate traditional methods. About 25% did not start on any method and another 12% became pregnant. Women who used hormonal methods (which are more prone to side effects) for long periods, would most likely switch to non-hormonal methods (Picavet et al, 2011).

Switching was seen to increase with age, with a lower share among the 15-24 years old women and the bigger share among the over 35 years old cohort. Age in the previous chapter emerged as a very strong influence on modern contraceptive use. The 15-24 years old had more likelihood of choosing modern contraceptives than their 35+ years old colleagues. The age of a woman at the time of discontinuation has consistently been linked with the three types of discontinuation. Older women are less likely to discontinue while in need, experience failure or switch methods than younger women (Ali et al, 2012; Bradley et al, 2009).

Women with primary education switch more, probably because they are the majority of contraceptive users in Kenya. This conforms to findings in the previous chapter that women with no education had more likelihood of choosing long-term methods, hence the lower switching. Women with secondary education, because they are more exposed to contraceptive information and services probably choose a more suitable method from initiation. They are thus more satisfied. Education was found to have strong influence on switching in several countries (Ali and Cleland, 2010).

Rural-urban differentials were not clearly exhibited despite their significance being evident in the choice of method analysed in the previous chapter. Wealth category had no significant differences in the rates. However, wealth exhibited negative influence on choice of short-term methods but no influence on long-term methods in the preceding chapter. Large differentials based on residence and wealth were reported by Ali and Cleland, (2010).

There were wide variations in the switching rates for lower contraceptive regions at 22% and higher contraceptive regions at 34%, which is consistent with other studies (Ali and Cleland, 2010). The results relate to the previous chapter's findings that women from lower contraceptive use regions were 61% less likely to opt for a short-term method in comparison to women from higher contraceptive use regions. In the 2014 dataset on which the

discontinuation analysis is based, regions of lower contraception were overwhelmingly dominating in choice of long-term methods.

The greatest concern in discontinuation is those who stop contraception while still in need. This study showed 35% to be in this category overall. The rates were largely consistent in the bivariate results on the socio-demographic variables. However, women of lower wealth and from lower contraceptive regions had much higher shares at 45% each, which raises serious concern. This may be explained by their tendency to choose short-term methods, which generally have higher discontinuation rates (Magadi and Curtis, 2003). Women who discontinue in spite of not wanting to get pregnant are exposed to unprotected sex and hence unintended pregnancies. This might have negative outcomes such as unsafe abortion, and maternal and child morbidity and mortality, reversing the good progress so far realized in maternal and child health (MoH et al, 2018; Bertrand et al, 2015).

The leading reason for discontinuation consistent with the KDHS results is side effects at a high of 38%. This is a serious health and policy concern. It raises queries whether users are not using the appropriate methods or may not have been properly counselled or did not get their preferred method. KDHS 2014 reveals that only 60% of current modern contraceptive users had been informed about potential side effects of their chosen method. Only 52% had been told how to handle side effects The KDHS 2014 also found side effects as the leading cause for discontinuations at 60 months, with rates of 29% (KNBS, 2015). Lower rates of 22% for side effects were reported by Ali et al, (2012) for several countries. The high rates of discontinuation belie issues of service quality and conflicts with the high satisfaction levels of 97% reported by family planning exit clients in Kenyan health facilities (NCPD, 2019).

Those who discontinue because they want to get pregnant were 24% and this is normal after 36 months of use for users who are spacing births. KDHS 2014 found 26% for women wanting to get pregnant after 60 months of use (KNBS, 2015).

Implants and IUDs are long-acting reversible contraception (LARC) methods preferred by those limiting births or not intending to get pregnant for several years, hence their discontinuation rates are lower (Shoupe, 2016; Megha et al, 2014). The study findings are consistent with other findings that method continuation was better with long-acting methods such as implants and IUDs that are not user dependent (Safari et al, 2019; Raine et al, 2011). Discontinuing the IUD calls for a proactive step to go for removal, unlike the injectable or pills.

As such, women who show more likelihood to discontinue may also be less likely to initiate the IUD (Ali and Cleland, 1999; Curtis and Blanc, 1997).

Injection being the most popular method in Kenya would naturally have more discontinuation episodes and at 36 months, most users would probably be discontinuing to get pregnant. It is more often used by women aged 25-34 who are mostly spacing, hence the higher discontinuations. The higher discontinuation episodes could also be explained by unintentional discontinuation in instances where women get late for re-injection or find the method unavailable during revisits (Baumgartner et al, 2007). It is also a hormonal method and tends to have more issues with side effects and consequently discontinuations (Birhane et al, 2015; Burke and Shisanya, 2014). Other studies in sub-Saharan Africa have found discontinuation rates for the injection to be normally low because the method is mostly used for long periods. However, the discontinuation rates are higher in other regions (Mitchel and Thistle, 2004; Par, 2003).

The pill is popular with women in the 35+ age category who are limiting births and exiting the reproductive age, hence the higher discontinuations. The higher discontinuations for pills and injection could be explained by health concerns and side effects common to the two methods (Cho, 2018; Kamalifard et al, 2014).

On age, the 15-24 age category had the lowest discontinuation episodes as expected, because their use of contraception is lower as they are just initiating sexual relationships or entering marriage. This conforms to several studies (Mahumud et al, 2015; Ersek et al, 2011). The 25-34-year-old women are the dominant users of contraception as they are spacers and could be experimenting and switching methods as they seek the most suitable ones for their needs. This may explain more discontinuation episodes among them. In other studies, however, younger women have been found to exhibit much higher discontinuation rates than older women and are more likely to abandon use while still in need of contraception than older women (Danielle et al, 2013; Rocca et al, 2013). Very high rates of discontinuation (as much as 60% in six months) among those aged under 25 have been documented in some countries (Kamalifard et al, 2014).

The results on education show less episodes of discontinuation among primary and secondary educated women. This might be explained by their better understanding of contraception from more exposure to contraceptive information and services. As such, they may be more settled on the method chosen. Similar results had been reported by Bradley et al, 2012.

More discontinuation episodes are seen for rural areas and low contraceptive regions. A possible explanation for these classifications which are largely similar is less access and exposure to contraceptive information and services (Irani et al, 2012; Rizvi and Irfan, 2012). Women of higher wealth also exhibited much higher episodes of discontinuation than their middle and lower counterparts at 46%.

In the regression, two contraceptive methods and age were found to influence discontinuation. Injection and implants emerged as very significant predictors of discontinuation at 36 months. These are the first and second most popular methods in Kenya, hence the result is not unusual.

The contraceptive method selected has been found to influence discontinuation, as reported in the discontinuation rates for various methods, especially hormonal ones. Women who used a method to limit their families significantly used it longer than those using the method for child spacing (Birahne, 2014). Variations in rates of discontinuation by method may point to user characteristics and the features of the method. Variations in rates of discontinuation by user characteristics may indicate the choice of methods for the users. There may be possible connection between the initiation of a contraceptive method and its discontinuation rate, with the use of the method. This relationship determines the overall contraceptive continuity (Magadi and Curtis, 2003.

Method characteristics have been shown to directly influence discontinuation rates, by influencing the risk of discontinuing a method and indirectly because they influence the choice of a method (Ali and Cleland, 1999; Curtis and Blanc, 1997). Also, users of the pill and injections may be more likely to discontinue than the users of other methods (Mahumud et al, 2015).

Age also was found to be a predictor of discontinuation in this study, especially for the 15-24 age group. Similarly, age has been shown to be a predictor of discontinuation in several recent and older studies with younger women below 20 years of age exhibiting higher risks of discontinuing contraception than older users. Younger women aged 15-24 are mostly in short-term relationships and experiment with different methods. They are therefore prone to using short-term contraceptives with more discontinuation rates (Mobolaji et al, 2016; Elfstrom and Stephenson, 2012). Mahumud et al, (2015), found 25–34 years old women more likely to discontinue compared to women aged less than 20 years. Age was in the previous chapter found to be a very strong determinant of contraceptive method choice in both short-term and long-term methods. The contraceptive intentions of spacing or limiting which influence choice of

117

method vary significantly with age. It therefore follows that age would influence continuation and discontinuation.

Age is a critical factor in discontinuation, especially among adolescents and young women and association varies by method. The age of a woman at the time of discontinuation was shown to be consistently associated with all three types of discontinuation. Older women were less likely to discontinue while in need, experience failure or switch methods than younger women (Ali et al, 2012; Bradley et al, 2009). Younger women were more likely to abandon use while still in need of contraception than older women (Danielle et al, 2013; Rocca et al, 2013). Age and parity are mostly correlated and either factor may be an indication of the other (Safari et al, 2019; Salhan and Tripathi, 2004)

Even though socio-economic factors are crucial in influencing the type of discontinuation, a weak association between them and discontinuation has been previously reported (Blanc et al 2002; Magadi et al 2001). This study complements these findings as it did not show the significance of socio-economic factors of education, wealth and residence in influencing discontinuation. However, the socio-demographic factors of age, residence, education, region and wealth emerged as significant explanatory variables for contraceptive method choice in the previous chapter, but with varying degrees of influence. Certain characteristics led women to choose certain methods, indicating a lot of differentials based on the variables. A study in Bangladesh found socio-economic factors significant in discontinuation (Mahumud et al, 2015).

6.9 Summary of Results

The overall rates of discontinuation were 30% for 12 months, 37% for 24 months and 74% for 36 months. The rates are in harmony with findings of other studies that have used KDHS data. LARCs had lower discontinuation rates as they posed a challenge in discontinuation because one needed to visit a provider or facility to have them removed. The injection method had the most discontinuation episodes followed by the pill.

The rates of switching at an overall of 31% were also consistent with other studies and were encouraging as they suggested availability of contraceptive choices for the women. Switching was higher in the older age groups, where there was more exposure to information and use of contraception. It was also higher among women with primary education who are the majority contraceptive users but no influence was seen in the residence and wealth variables. Higher

contraceptive regions, as expected, exhibited higher rates of switching, possibly from the higher use of short-term methods.

A serious challenge was shown in 35% of women discontinuing contraception while still in need. Women of lower wealth status from lower contraceptive regions led with a share of 45% for each. This was possibly because of their tendency towards short-term methods. Side effects was the leading reason for discontinuation at 38% and it brought to the fore the quality of pre- and post-initiation of contraception counselling. A quarter (25%) of women users discontinued at 36 months, as they desired to get pregnant.

More episodes of discontinuation were recorded among women aged 25-34, those with no education, those from rural areas and lower contraceptive regions, and those of higher wealth. Two contraceptive methods, injection and implants emerged as very significant predictors of discontinuation at 36 months alongside age.

CHAPTER 7

SUMMARY, CONCLUSIONS AND RECOMMENDATIONS

7.1 Introduction

This chapter gives a summary of the study in terms of objectives, data, findings, conclusions and recommendations. The topic of the study was contraceptive use dynamics, which involves the choice and initiation of contraception and continuation or discontinuation.

The study aimed to highlight the impact of contraceptive discontinuation on retention of contraceptive users through establishing the prevailing trends in contraceptive method choice, identifying the determinants of method choice and finally examining the determinants of contraceptive discontinuation. The study had a national scope and analysed secondary data obtained from the three surveys of KDHS 2003, 2008/2009 and 2014. It aimed to establish a trend in the use of contraception and to examine if there were any changes in the determinants of method choice and of discontinuation over the study period. Descriptive analysis was done using frequencies, cross-classification and life tables, while multinomial logistic and Cox proportional-hazards regression analyses were used to identify determinants of contraceptive method choice and those of discontinuation respectively.

7.2 Summary

The study findings are discussed in detail in Chapter 4, Chapter 5 and Chapter 6. Chapter 4 is the preliminary analysis addressing the first objective of the study and dealt with the use of modern contraception from 2003 to 2014. It establishes the trends in choice for the major modern methods of contraception of pill, injection, intrauterine device (IUD), sterilization and implants over the study period.

The overall picture presented is that of declining prevalence of modern contraceptive methods (except for the condom and injection) between 2003 and 2008/2009, then a major upsurge towards 2014. The method mix was heavily imbalanced and dominated by the injection. The injection was shown to be the most used modern contraceptive since 2003. It had a gradual upsurge in use among modern contraceptive users from 45% in 2003 to 50% in 2014, and was thus used by half of all women on contraception. The rise of the injection had been reported earlier for Kenya by Magadi and Curtis, (2003) and is the leading contraception method in sub-Saharan Africa (UN, 2019).

There was a particularly rapid increase in the use of implants from 5% in 2003 to 18% in 2014 Implants registered the biggest upsurge of 13 percentage points to become the second most popular method after injection. The uptake of implants increased most among women of 15-24 years (100%) and among those with primary education (60%). This was a deliberate result of promotion campaigns led by the Ministry of Health in collaboration with other partners. There was overwhelming increase in long-acting reversible contraception (LARC), particularly IUDs and implants use in Nyanza and Western regions (Keyonzo et al, 2015; Hubacher et al, 2012).

As a result of the rising adoption of implants, and the dominance of the injection, there was an overall decline of about 50% in the use of the pill from 22% in 2003 to 13% in 2014 and for female sterilization from 13% to 6%. The use of IUDs declined slightly from 7% to 6%.

There were some interesting findings in the use of modern contraception. Notable was an increase in pill use among the 35-49 age group by 10 percentage points from 30% to 40% and a decline of IUD use among the same group from about 65% to 50% between 2008/2009 and 2014.

Another interesting finding was the declining trend in the use of modern contraceptives in secondary educated women and those from higher wealth category. This is a recent trend that has been reported elsewhere (Marston et al, 2017).

The majority of the LARC users were limiters in all the surveys, but there was a consistent decline of 12 percentage points to 59% in 2014 from 71% in 2003. This was matched by an equal gain among spacers. Looking at the profiles of contraceptive users, most users were in the 25 to 34 age group, had primary education and resided in the rural areas.

Chapter 5 addressed the second objective of the study. It involved analysis on the determinants of contraceptive method choice as a precursor to establishing the determinants of contraceptive discontinuation because of the close link between the method choice and discontinuation. Contraceptive methods were categorized as short-term (condom, pill, injection), long-term (IUDs, implants) and permanent (sterilization).

Interesting findings revealed the declining use of short-term methods and a rapid rise in the use of long-term methods, with their share doubling between 2003 and 2014. The biggest increase of almost threefold in the use of long-term methods was registered among younger women aged 15-24. Permanent methods were on a rapid decline, with their share reducing by 50% in the review period. Other studies have reported similar trends of declining use of short-term contraceptives and permanent methods, while the use of long-term contraception has been on

the upsurge in Kenya and sub-Saharan Africa (Jacobstein, 2018; Laryea et al, 2016). The changes have been attributed to the policy shift encouraging long-acting reversible contraception and the FP2020 campaigns (Ahmed et al, 2019; Chen et al, 2008).

Regression results showed that the selected socio-demographic factors of education, age, wealth, residence and region were significant explanatory variables for contraceptive method choice, but with varying degrees of influence. However, their influence was best depicted in the 2014 dataset. Age was consistently a very strong positive predictor across the three datasets for all its categories in the choice of short-term and long-term contraception.

Education had mostly moderate or very strong influence over both short-term and long-term methods, but its effects were more clearly defined in the women with primary education. Residence showed moderate influence in the choice of short-term and long-term contraceptive methods. Similar results have been reported in Kenya and elsewhere in various studies (Hembah-Hilekaan et al, 2018; Ochako et al, 2016; Novignon and Novignon, 2014; Kimani et al, 2013). The results showed support for the alternative hypotheses that socio-economic factors have a relationship with contraceptive method choice. The null hypotheses that there was no statistical relationship was therefore rejected. They supported the topic of study that the selected independent variables influenced the dependent variable (method choice).

Chapter 6 presented the analysis on determinants of contraceptive discontinuation, which was the third objective and focus of the study. The analysis focused on discontinuations after 36 months' duration and used KDHS 2014 data only.

The overall rates of discontinuation at 12 months were 30%, for 24 months 37% and for 36 months 74%. The pill led in discontinuations at 12 months and 36 months, while the injection led at 24 months. Rates for all methods were high at 36 months. IUDs had the lowest rates across the time durations. Highest episodes of discontinuation were recorded among women aged 25-34, those with no education, those living in rural areas and low contraceptive regions. Side effects emerged as the leading reason for discontinuation at 38%. Some studies have found similar results for Kenya for the 2003 KDHS (Ontiri et al, 2020; Ali et al, 2012, Agwanda, 2005) and for 2014 KDHS (Ontiri et al, 2020). The high rates of discontinuation show missed opportunities for improvements in contraceptive prevalence and belie issues of service quality. They conflict with the high satisfaction levels of over 90% reported by family planning exit clients in Kenyan health facilities (NCPD, 2019).

The greatest concern in discontinuation is those who stop contraception while still in need. Discontinuation while in need was 35% and the injection led alongside the implant at 38% each. Women of lower wealth and from lower contraceptive regions had very high shares at 45% each, which raises serious concern. Comparable results have been documented in other studies (Ali et al, 2014).

Overall switching rates were 31%, meaning that one in three women were able to switch when dissatisfied with a method. IUDs had the highest share of switching at 42%, followed by the pill at 39%. Switching was seen to increase with age, with the biggest share registered among the over 35 years old cohort. More switching was observed among women with primary education and from higher contraceptive regions. The results complement those of previous studies (Castle and Askew, 2015; Ross et al, 2015).

The Cox regression analysis identified two variables as predictors of discontinuation: method of contraception (injection and implants) and age (15-24). Those aged 15-24 were 1.2 times more likely to discontinue relative to those aged 35+. Age has been identified as a critical factor in discontinuation, especially among adolescents and young women (Danielle et al, 2013). Injection users were 20% less likely to discontinue than pill users, while implant users were 42% less likely to discontinue than pill users. Based on the results, the null hypotheses that there was no relationship between method choice and age on discontinuation were rejected and the alternative hypotheses that there was a likely statistical relationship between the two variables and discontinuation was accepted.

Method characteristics have been shown to influence discontinuation rates directly and indirectly in other studies because they influence the choice of a method, while methods influence discontinuation. The study findings revealed that method continuation was better with LARC that were not user dependent. The findings were in consensus with other studies (Mahumud et al, 2015; Birahnei, 2014).

7.3 Conclusions

The study revealed that the high increase in the use of modern contraception occurred between 2008 and 2014, which coincided with reported declines in the total fertility rate (TFR) and population growth rates. The results possibly herald the reaping of benefits from the repositioning and scaling up of family planning campaigns after the stagnation revealed in KDHS 2003. This is evident in the uptake of modern contraceptive methods, especially the more effective ones. Most likely, the CPR will continue to grow while the TFR may decline

further due to the continued government efforts to improve access to information and contraception services countrywide through the FP2020 initiative.

The observed general shift among all contraceptive users is from shorter-acting contraceptives methods (SACs) towards long-acting reversible contraception (LARC). These are more efficient as users can attain perfect use, are convenient, have high user satisfaction and record less discontinuations. Kenya will likely reap these benefits in reduced unintended pregnancies and unsafe abortions as well as lower the unmet need for family planning. The continued use of more effective methods is expected to result in further decline in fertility.

The finding that implant use is rising rapidly among all women sub-groups and has become the second most popular method suggests the waning of the dominance of the injection. It could mean that implants could possibly overtake the injection in prevalence. There is no doubt that injectables have contributed a lot to the growth in modern contraceptive use over the past two decades in Kenya. The heavy demand already generated for the implant will possibly sustain its upsurge towards becoming the leading method of contraception in Kenya. The higher prevalence of implants over IUDs suggests higher acceptability, probably because of the ease of insertion in users.

The choice of contraceptive methods was shown to be influenced by socio-demographic variables of age, education, residence, region and wealth. The trend is expected to continue due to the major disparities based on those factors in Kenya. Age was especially a very strong determinant of both contraceptive method choice and discontinuation. Age is therefore expected to be the basis of future reproductive health programmes targeted at the large adolescent and youth population.

The high rates of discontinuation are shown to have persisted despite the very successful family planning programme. Since the contraception method used emerged as a strong predictor of discontinuation, it is hoped that discontinuations might reduce slightly with the adoption of LARC methods, which require a provider to effect the discontinuation.

More discontinuation episodes were seen for rural areas and low contraceptive regions. This suggests equity has not been achieved on issues of access and exposure to contraceptive information and services. These issues need to be addressed comprehensively in future family planning campaigns.

With the very high contraceptive prevalence, Kenya is approaching the plateau for demand satisfied, which is about 80%, meaning that there will be fewer new contraceptive users, hence

the need to enhance continuation among current users. As such, service providers should ensure women are given the right method for their fertility intentions of either spacing or limiting. Use of LARCs should be recommended in line with the current policy direction in Kenya.

In general, the study results suggest that Kenyan women are making rational choices in terms of their goals to manage their fertility based on their needs for spacing, delaying or limiting births.

7.4 Recommendations for Research

Declining choice of modern contraception has been documented for women of secondary education and higher wealth. In general, these are the women who are supposed to choose modern contraception more due to their greater access to contraceptive information and services. Some qualitative studies would perhaps shed more light on this interesting aspect relating to women and modern contraception.

Side effects have shown their dominating influence on discontinuation. More studies are needed to reveal which side effects are prevalent so that they can be addressed. Such studies would be especially useful for the IUD, which is a long-term method, but with very high discontinuation rates.

It would be very helpful to the family planning programme to find out which methods those who switch adopt. Is it to the more or less effective methods? For those who discontinue while in need of contraception, it would be useful to find out what happens to them. Do they get pregnant or switch to other methods later?

An interesting observation was the increase of pill use among women over 35 years of age. Why these women who have most likely attained their desired family sizes and should ideally be using LARC methods would opt for short-term methods would be another good area for research.

7.5 Recommendations for Policy

The demand for contraceptives is intertwined with their supply, such that as demand increases, the pressure for supplies increases. The great demand evident for contraception should be matched by initiatives to reduce barriers in the commodity supply chain in order to reduce stock outs.

Although initial costs of LARCs are higher than for short-term methods, they are, in the long-term cost-effective because resupply and clinic revisits are fewer. LARCs heavily hinge on

providers, therefore the demand they generate calls for investment in quality skills for insertions and removals. The skills training may enhance the acceptability and continuation rates of the IUD.

A high demand has been shown for implants by women aged 15-24 years, the age group with the fastest growing population in the reproductive age. It is imperative that their access to comprehensive contraceptive information and services be improved. Information, education and communication (IEC) promoting long-acting contraceptive methods targeting adolescents and youth should be developed so that they can make informed choices on methods that are appropriate for their current and future fertility desires.

The increase in uptake of implants among women in the 15-24 age group has brought about a major decline in use of condoms, which translates to less protection against HIV. Use of condoms could be recommended besides LARC for those who may be exposed to risky sexual behaviour.

The strong relationship between socio-economic factors and contraceptive method choice points to the need to address these factors in future attempts to increase contraceptive prevalence or promote certain methods. Alongside this is decline in uptake of modern contraception among women of higher education and wealth and lower contraceptive use among women with no education. Women empowerment is therefore critical to improvements in contraceptive prevalence.

The rising use of the pill among women aged above 35 years seen together with the decline in their use of IUDs is a matter of concern. It is important to find out whether the IUD users are switching to the pill, which is a short-term, less effective method with higher incidences of unintended pregnancies. This scenario calls for the need to address the long-standing challenges of insertion and side effects of IUDs to curb the trend.

Given the established strong link between method choice and discontinuation, initiatives to discourage discontinuation while in need should give method choice a central place.

Side effects have continued to stalk continuation of contraception and have persisted as the main reason for discontinuation, at almost 40%. This raises queries as to whether users are properly counselled on the appropriate methods for their needs or whether they initiated their preferred method. Service providers need refresher trainings to ensure they provide updated and accurate information on dealing with reported side effects. Community health volunteers (CHVs) could follow up clients to deal with side effects as they emerge, guide on options for

switching and re-attract past users of contraception. This will reduce both unmet need and discontinuations due to side effects.

The range of methods available or method mix has a strong relationship with contraceptive prevalence. Expanding the method mix would very likely influence continuity of use, hence contraceptive prevalence. It would also encourage switching to more effective methods and thus reduce discontinuations. LARCs are essential in the method mix as they include both hormonal and non-hormonal methods.

Discontinuation while in need which is not followed by switching is a serious policy concern and should be minimized with information on switching. Women who discontinue are exposed to unprotected sex and the risk of unintended pregnancies that may result in negative outcomes such as unsafe abortion as well as maternal and child morbidity and mortality. These negative outcomes may reverse the good progress so far realized in maternal and child health indicators.

REFERENCES

ADETUNJI J (2011). Rising popularity of injectable contraceptives in sub-Saharan Africa. *African Population Studies* 25 (2). GH/PRH/PEC, USAID, Washington, DC 20523, USA.

AGWANDA A. (2005). Contraceptive use dynamics in Kenya: Analysis of method choice and discontinuation. Working Paper No. 5. National Coordinating Agency for Population and Development.

AHMED S., CHOI Y., RIMON J., ALZOUMA S et al (2019). Trends in contraceptive prevalence rates in Sub-Saharan Africa since the 2012 London Summit on Family Planning: Results from repeated cross-sectional surveys. *Lancet Global Health* 7: e904-11.

AHMED S., LI Q., LIU L. and TSUI A. (2012). Maternal Deaths Averted by Contraceptive Use: An Analysis of 172 Countries. *The Lancet* 380 (9837): 111–125.

AJAYI A., ADENIYI O. and AKPAN W. (2018). Use of traditional and modern contraceptives among childbearing women: findings from a mixed methods study in two south western Nigerian states. BMC Public Health 18:604.

AKIN J. and ROUS J. (1997). 'Effect of Provider Characteristics on Choice of Contraceptive Behaviour: A two Equation full information Maximum Likelihood Estimation''. *Demography* 34(4).

ALI M. and CLELAND J. (2010). Contraceptive Switching after Method-related Discontinuation: Levels and Differentials. *Studies in Family Planning* 41(2):129.

ALI M. and CLELAND J. (1999). Determinants of Contraceptive Discontinuation in Six Developing Countries. *Journal of Biosocial Science* 31(3):343-360.

ALI M. and CLELAND J. (1995). Contraceptive Discontinuation in Six Developing Countries: A Cause Specific Analysis. *International Family Planning Perspectives* 21(3).

ALI, M., PARK M. H. and NGO T. D (2014). Levels and Determinants of Switching Following Intrauterine Device Discontinuation in 14 Developing Countries. *Contraception*. 90: 47–53.

ALI M., CLELAND J. and SHAH I. (2012). Causes and Consequences of Contraceptive Discontinuation: Evidence from 60 Demographic and Health Surveys. Africa, Asia, Eastern Europe and Latin America.

ALI M. M. (2001). Quality of Care and Contraceptive Pill Discontinuation in Rural Egypt. *Journal of Biosocial Science*, 33(2): 161-72.

ALLEN R, CWIAK C, KAUNITZ A, (2013). Contraception in Women over 40 years of age. *Canadian Medical Association* (CMAJ) 185(7): 565-573.

AMIN S., DIAMOND, I. and STEELE, FA. (1997). Contraceptive and Religiosity in Bangladesh. In the Continuing Demographic Transition. Oxford, Clarendon Press.

ANDRADE C. (2019). The *P* Value and Statistical Significance: Misunderstandings, Explanations, Challenges, and Alternatives. *Indian Journal of Psychological Medicine*. 41(3): 210–215.

ASKEW I., MAGGWA N. and OBARE F. (2016). Fertility Transitions in Ghana and Kenya: Trends, Determinants, and Implications for Policy and Programs. *Population and Development Review* 43 (51): 289-307.

AZMOUDE E., BEHNAM H., BARATI-FAR S., and ARADMEHR M (2017). Factors Affecting the Use of Long-Acting and Permanent Contraceptive Methods among Married Women of Reproductive Age in East of Iran. *Women's Health Bulletin* 4(3).

BABALOLA S., NEETU J., AJAO B. and SPEIZER I. (2015). Ideation and Intention to Use Contraception in Kenya and Nigeria. *Demographic Research* -. 33(8): 211-238.

BAUMGARTNER J., MORRONI C., MLOBELI R., OTTERNESS C et al (2007). Timeliness of contraceptive reinjections in South Africa and its relation to unintentional discontinuation. *International Family Planning Perspectives* 33(2):66–74.

BBAALE E. and MPUGA P. (2011). Female Education, Contraceptive Use, and Fertility: Evidence from Uganda. *Consilience*: *The Journal of Sustainable Development*. 6(1): 20–47.

BEKELE T., GEBREMARIAM A. and TURA P (2015). Factors associated with contraceptive Discontinuation in Agarfa District, Bale Zone, South East Ethiopia. *Epidemiology (Sunnyvale)* 5:179.

BERTRAND J., WARD V and SANTISO-GÁLVEZ R. (2015). Family planning in Latin America and the Caribbean: The achievements of 50 years Chapel Hill, NC: MEASURE Evaluation.

BERTRAND J., SULLIVAN T., KNOWLES E., ZEESHAN M and SHELTON J (2014). Contraceptive Method Skew and Shifts in Method Mix in Low- and Middle-Income Countries. *International Perspectives on Sexual and Reproductive Health* 40(3):144-153

BAUMAN, E. and VARAVEJ P. (1972). Reason for Contraception and Choice between IUD and Pill: Implications for the Differences in Continuation Rates. *Social Biology* 9(3):292-296.

BIDDLECOM E and FAPOHUNDA B (1998). Covert contraceptive use: prevalence, motivations and consequences, *Studies in Family Planning* 29(4): 360-372,

BIRHANE K., HAGOS S. and FANTAHUN M. (2015) Early Discontinuation of Implanon and Its Associated Factors Among Women Who Ever Used Implanon in Ofla District, Tigray, Northern Ethiopia. *International Journal of Pharma Sciences and Research* 6(3).

BLANC A., CURTIS S. and CROFT T. (2002). Monitoring Contraceptive Continuation: Link to Fertility Outcomes and Quality of Care. *Studies in Family Planning* 33(2):127-140

BLANC A., TSUI A., CROFT T. and TREVITT J. (2009) Patterns and Trends in Adolescents' Contraceptive Use and Discontinuation in Developing Countries and Comparisons with Adult Women. *International Perspectives on Sexual and Reproductive Health* 35(2).

BLANC A., CURTIS S. and CROFT T (1999). Does Contraceptive Discontinuation Matter? Quality of Care and Fertility Consequences. MEASURE Evaluation Technical Report Series, No. 3

BMGF (2014). Implant Access Program: Expanding Family Planning Choices for Women. Bill and Melinda Gates Foundation

BONGAARTS J. and POTTER R. (1983). Fertility, Biology, and Behaviour: An Analysis of the Proximate Determinants. New York. Academic Press.

BRADLEY S., CROFT T. and WESTOFF C. (2012), Revising Unmet Need for Family Planning. DHS Analytical Studies 25. Calverton, Maryland: Macro International.

BRADLEY S., SCHWANDT H. and KHAN S (2009). Levels, Trends, and Reasons for Contraceptive Discontinuation. DHS Analytical Studies 20. Calverton, Maryland: Macro Int.

BRANUM A. and JONES J. (2015). Trends in Long-acting Reversible Contraception Use among U.S. Women Aged 15–44 - National Centre for Health Statistics NCHS Data Brief No. 188.

BRUCE J (1990). Fundamental Elements of Quality of Care: A Simple Framework. *Studies in Family Planning* 21(2): 61-91

BRYANT A., HAMELA G., GOTTERT A., STUART G. and KAMANGA G. (2015). Reasons for Intrauterine Device Use, Discontinuation and non-use in Malawi: A qualitative study of women and their partners. *African Journal of Reproductive Health* 19(4): 50

BULATAO R., PALMORE J. and WARD S. (1989). Choosing a Contraceptive Method Choice in Asia and the United States. Westview Press.

BULATAO R. and LEE R. (1983). Determinants of Fertility in Developing Countries Vol. 1 Supply and Demand for Children. New York. Academic Press.

BURKE H. M. and SHISANYA C. A. (2014). Evaluation of a Communication Campaign to Improve Continuation among First-Time Injectable Contraceptive Users in Nyando District, Kenya. *International Perspectives on Sexual and Reproductive Health* 40(2):56–67.

BURKE H. M. and SHISANYA C. A. (2011). Qualitative Study of Reasons for Discontinuation of Injectable Contraceptives among Users and Salient Reference Groups in Kenya. *African Journal of Reproductive Health 15(2).*

CALLAHAN R. and BECKER S. (2012). The reliability of calendar data for reporting contraceptive use: evidence from rural Bangladesh. *Studies in family planning* 43(3):213–22. https://doi.org/10.1111/j.1728-4465. 2012.00319.x PMID: 23185864.

CARTON T. and AGHA S. (2009) Changes in Contraceptive Use and the Method Mix in Pakistan 1990-91 to 2006-07. PSI/Green Star Marketing.

CASTLE S. and ASKEW I. (2015). Contraceptive Discontinuation: Reasons, Challenges, and Solutions. FP2020. Population Council.

CHAURASIA A. (2014). Contraceptive Use in India: A Data Mining Approach. *International Journal of Population Research*. Hindawi.

CHEN ZE., GLASIER A., WARNER P. (2008) Why are rates of sterilization in decline? A pilot study designed to explore reasons for declining female sterilization in Scotland. *Contraception* 78(4):309-14

CHERSICH M., WABIR N., RISHER K., SHISANA O., CELENTANO D., REHLE T., EVANS M., REES H. (2017). Contraception coverage and methods used among women in South Africa: A national household survey. *South African Medical Journal* 107 (4).

CHO M. (2018). Use of Combined Oral Contraceptives in Perimenopausal Women. *Chonnam Medical Journal.* 54:153-158

CHOE, M. K. (1989). "Multinomial Logit Analysis of Contraceptive Method Choice" in Bulatao, Palmore and Ward (eds) Choosing a Contraceptive: Method Choice in Asia and the United States. Colorado, Westview Press.

CHUMNIJARAKIJ, T., GROSSMAN R., ONTHUAM Y., MUTTAMARA S. and CHARUMILIND P (1981). A study of Contraceptive Choice and Use in Bangkok Metropolis Health Clinics. *Contraception* 24(3):245-258.

CLELAND J., CONDE-AGUDELO A., PETERSON H., ROSS J. and TSUI A. (2012). Contraception and Health. *The Lancet* 380 (9837): 149-156.

CORNELIUS R. and NOVAK J. (1983). Contraceptive Availability and Use in Five Developing Countries. *Studies in Family Planning* 14(12):302-317.

COX D. R. (1972). Regression Models and Life Tables. *Journal of the Royal Statistical Society*. Series B 34(2).

CRICHTON, J., (2008) "Changing Fortunes: Analysis of Fluctuating Policy Space for Family Planning in Kenya". *Health Policy and Planning* 23. (5): 339-350.

CURTIS S., EVENS E. and SAMBISA W. (2011). Contraceptive Discontinuation and Unintended Pregnancy: An Imperfect Relationship. *International Perspectives on Sexual and Reproductive Health* 37(2):58–66.

CURTIS S and BLANC A (1997). Determinants of Contraceptive Failure, Switching and Discontinuation: An Analysis of DHS Contraceptive Histories. Calverton, Maryland, USA.

DANIELLE S. GRUNLOH B., CASNER T., SECURA G., PEIPERT J. and MADDEN T. (2013). Characteristics associated with Discontinuation of Long Acting Reversible Contraception within the first 6 months of Use. *Obstetrics & Gynaecology* 122 (6):1214-1221.

DANIELS K., MOSHER W. AND JONES J. (2013). Contraceptives Women have used: United States, 1982–2010. National Health Statistics Reports; no 62. Hyattsville, MD: National Centre for Health Statistics.

DAVIDSON A. (1997). Injectable Contraceptive Discontinuation and Subsequent Unintended Pregnancy among Low-Income Women. *American Journal of Public Health* 87(9).

D'ANTONA A., CHELEKIS J., D'ANTONA M. and SIQUEIRA A. (2009) Contraceptive Discontinuation and Non-use in Santarem, Brazilian Amazon. Cad. Saúde Pública 25(9).

DE GRAFF D., BILSBORROW R. and GUILKEY D. (1997). Community Level Determinants of Contraceptive Use in the Philippines: A Structural Analysis. *Demography* 34 (3).

DIAMOND-SMITH N., CAMPBELL M., MADAN S. (2012). Misinformation and fear of side effects of family planning. *Cult Health Sex* 14:421-33.

DUVALL S., THURSTON S., WEINBERGER M., NUCCIO O. and FUCHS-MONTGOMERY N. (2014). Scaling up delivery of contraceptive implants in Sub-Saharan Africa: Operational experiences of Marie Stopes International. *Global Health: Science Practice*.2(1):72–92.

ECHO (2019). HIV Incidence among Women using intramuscular depot medroxyprogesterone acetate, a copper intrauterine device or a Levonorgestrel Implant for contraception: *a randomized, multicentre, open label trial. The Lancet* 394:303-313,

ECHO (2015). The Evidence for Contraceptive Options and HIV Outcomes Study. http://echo-consortium.com/the-evidence-for-contraceptive-options-and-hiv-outcomes-echo-study-2/.

ELFSTROM K. and STEPHENSON R. (2012). The role of Place in Shaping Contraceptive Use among Women in Africa. *PLOS ONE* 7(7): e406-70

ENTWISLE B., RINDFUSS R., WALSH S., EVANS T and CURRAN S. (1997). Geographical Information Systems, Spatial networks and Contraceptive Choice. *Demography* 34 (2): 171-187.

ENTWISLE B., RINDFUSS R., WALSH S., EVANS T and CURRAN S. (1996). Community and Contraceptive Choice in Rural Thailand: A Case study of Nang Rong. Demography 33 (2): 171-187.

ERSEK J. (2011). Satisfaction and Discontinuation of Contraception by Contraceptive Method among University Women. *Maternal Child Health Journal* 15:497–506.

FHI, NASCOP, DRH, JHPIEGO, and AMKENI Project (2006). Integrating Family Planning Services into Voluntary Counselling and Testing Centres in Kenya: Operations Research Results. Research Triangle, NC, USA: Family Health International.

FISCHER M. (2013). A Case for Female Education and Medical management. FEMM Foundation.

FP2020- 2017 COMMITMENT - GOVERNMENT OF KENYA http://www.familyplanning2020.org/kenya

FROST J., SINGH S. and FINER L. (2007). Factors associated with Contraceptive Use and Non-use. United States, 2004. *Perspectives on Sexual and Reproductive Health* 39: 90-9

FUTURES INSTITUTE (2013) The Impact of Stock outs on the Use of Modern Contraception. http://www.xcdsystem.com. ICFP2013/abstract/panels/78.

GEBREMEDHIN M., TESFAYE G., BELACHEW A. and DESTA D. (2016). Factors Influencing Modern Contraceptive Method Preference among Women of Reproductive Age in Central Zone of Tigray Region, Northern Ethiopia. *International Journal of Healthcare* 2(1).

GODFREY M., CHIN P., FIELDING L., FISCELLA K and DOZIER A. (2011). Contraceptive methods and use by women aged 35 and over: A qualitative study of perspectives. *BMC Women's Health*.11:5.

GOMEZ M. and CLARK B. (2014). The Relationship between Contraceptive Features Preferred by Young Women and Interest in IUDs: An Exploratory Analysis. *Perspectives on Sexual and Reproductive Health* 46(3):157–163.

HADDAD L., WALL K., VWALIKA B., KHU N., BRILL I., KILEMBE W., STEPHENSON R., CHOMBA E., VWALIKA C., TICHACEK A. and ALLEN S. (2013). Contraceptive Discontinuation and Switching Among Couples Receiving Integrated HIV and FP Services in Lusaka, Zambia. *AIDS* 27: S93-103.

HAMEED W., AZMAT SK., ISHAQUE M., HUSSAIN W., MUNROE E., MUSTAFA G., KHAN F., ABBAS G., ALI S., ASGHAR Q., ALI S., AHMED A. and HAMZA H. (2015). Continuation Rates and Reasons for Discontinuation of IUD in Three Provinces of Pakistan: Results of a 24-Month Prospective Client Follow Up. *Health Research Policy and Systems* 13-53.

HAMILTON B., MARTIN J., OSTERMAN M., DRISCOLL A., and ROSSEN B. (2018). Provisional Data for 2017 Vital Statistics Rapid Release no.4. Division of Vital Statistics, National Center for Health Statistics.

HARBISON, S. and ADETUNJI, J (2009). Contraceptive Choice and Discontinuation in Selected African Countries: A Focus on Injectables. Paper presented at the International Population Conference in Marrakesh, Morocco Sept 27th –Oct 2, 2009.

HEMBAH-HILEKAAN S., OJABO A., ONYEMOCHO A., ONCHE P., MAANONGUN M., HILARY D. and ISHELL C. (2018). Trends in Contraceptive Choices among Women Attending the Family Planning Clinic in a Nigerian Tertiary Hospital in Makurdi, Nigeria. *Journal of Reproductive Health and Contraception* 3(2): 1122.

HIGGINS J. (2014). Celebration Meets Caution: LARC's Boons, Potential Busts, and the Benefits of a Reproductive Justice Approach. *Contraception* 89:237-241.

HOTCHKISS D., MAGNANI R., RUTENBERG N., CORREIA L., MORGAN G. and SUTULA M. (1995). Access to FP Services, Service Quality and Contraceptive Use in North East Brazil. Population Association of America Annual Meeting. San Francisco.

HPP (2014). Impact Now Model: Estimating the Health and Economic Impacts of Family Planning Use. United States Agency for International Development (USAID) and Marie Stopes International (MSI). Health Policy Project. Washington DC. Futures Group.

HUBACHER D., OLAWO A., MANDUKU C., KIARIE J. and CHEN P. (2012). Preventing Unintended Pregnancy among Young Women in Kenya: Prospective Cohort Study to offer Contraceptive Implants. *Contraception* 86(5):511–7.

HUBER B. and HUBER R. (2009). Contraceptive Choices of Women 35-44 Years of Age: Findings from the Behavioural Risk Factor Surveillance System. *Ann Epidemiology*19(11):823–33.

HUDA F., CHOWDHURY S., and SIRAJUDDIN MF. (2014). Importance of Appropriate Counselling in Reducing Early Discontinuation of Norplant in a Northern District of Bangladesh. *Journal of Health, Population and Nutrition 32(1):142-148*

HUDA F. and CHOWDHURY S. (2014). Reduce Contraception Discontinuation in Bangladesh by Improving Counselling on Side Effects. *STEP UP* Policy Brief.

ICPD. (2014). ICPD Beyond 2014 Report. Available at http://icpdtaskforce.org/beyond-2014/ in-Family-Planning/#More-1429.

IKAMARI L. (2011). An Innovative and Integrated Initiative to Reposition Intrauterine Contraceptive Devices in the National Family Planning Programme. In: Sharing Innovative Experiences: Experiences in Addressing Population and Reproductive Health Challenges. UNDP, New York.

IMBUKI K., TODD C., STIBICH M., SHAFFER D. and SINEI S. (2010). Factors Influencing Contraceptive Choice and Discontinuation among HIV+ Positive Women in Kericho, Kenya. *African Journal of Reproductive Health 14(4):103*.

IPPF (2011). - Understanding Demand and Supply for contraception. Fact card 3. International Planned Parenthood Federation, UK.

IRANI L., SPEIZER I., CURTIS S and ONGECHI K. (2012). Impact of place of residence and household wealth on contraceptive use patterns among urban women in Kenya. Paper presented at the Population Association of America.

IYER S. and WEEKS M. (2009). Social Interactions, Ethnicity and Fertility in Kenya. Cambridge Working Papers in Economics. Faculty of Economics, University of Cambridge.

JACOBSTEIN R. and POLIS C. (2014) Progestin-Only Contraception: Injectables and Implants. *Best Practice & Research: Clinical Obstetrics & Gynaecology*. 28(6):795–806.

JACOBSTEIN R. (2018). Liftoff: The Blossoming of Contraceptive Implant Use in Africa. *Global Health: Science and Practice* 6(1):17-39.

JACOBSTEIN R. and STANLEY H (2013). Contraceptive implants: providing better choice to meet growing family planning demand. *Global Health: Science and Practice* 1(1):11–17.

JAIN A. (2014). The Leaking Bucket Phenomenon in Family Planning. Champions for Choice. Http://Champions4Choice Org/2014/09/. The-Leaking-Bucket-Phenomenon- In-Family-Planning/#More-1429.

JAIN A., OBARE F., RAMARAO S. and ASKEW I. (2013). Reducing Unmet Need by Supporting Women with Met Need. International Perspectives on Sexual and Reproductive Health 39 (3):133-41.

JAIN A. (1989). 'Fertility Reduction and the Quality of Family Planning Services". *Studies in Family Planning*, 20 (1): 1-16.

JONES J., MOSHER W. and DANIELS K. (2012). Current Contraceptive Use in the United States, 2006–2010, and Changes in Patterns of Use Since1995. National Health Statistics Reports Number 60.

JONES E., BENIGER J. and WESTOFF C. (1980). Pill and IUD discontinuation in the United States, 1970-1975: The influence of the media. Family Planning Perspectives 12(6):293-300.

JOSEPH C. and HAWS J (1990). Is permanent contraception acceptable in Sub-Saharan Africa? *Studies in Family Planning* 21(6):322–326.

JOSHI R., KHADILKAR S. and PATEL M. (2015). Global Trends in use of Long-acting Reversible and Permanent Methods of Contraception: Seeking a Balance. *International Journal of Genecology & Obstetrics* 131(S1).

KAMALIFARD M., MALKOUTI J., PEZESHKI M-Z. and VELAYATI A. (2014). Continuation and Discontinuation Reasons of LD Contraceptives among Iranian Women. *International Journal of Women's Health and Reproduction Sciences* 2(5): 287-290

KAUNITZ A. (2008). Hormonal contraception in women of older reproductive age. *New England Journal of Medicine* 358:1262-70.

KAUNITZ A. (2000) Injectable Contraception: New and Existing Options. *Obstetrics and Gynaecology* Clinics of *North America* 27:741-780

KAVANAUGH M. and ANDERSON R. (2013). Contraception and Beyond: The Health Benefits of Services Provided at Family Planning Centers. Guttmacher Institute.

KEYONZO, N., NYACHAE, P., KAGWE, P., KILONZO, M. et al (2015). From Project to Program: Tupange's Experience with Scaling up Family Planning Interventions in Urban Kenya. *Reproductive Health Matters* 23(45).

KHRAIF R., SALAM A., AL-MUTAIRI A., ELSEGAEY I. and AJUMAH A. (2017). Dynamics of Contraceptive Use: A study of King Saud University Women Staff, Riyadh. *Middle East Society Journal* 22(1).

KIMANI, M., NJERU M., AND NDIRANGU, G. (2013). Regional Variation in Contraceptive Use in Kenya: Comparison of Nyanza, Coast and Central Provinces. *African Population Studies* 27(1): 43-52.

KNBS (2019). Kenya Population and Housing Census: Vol III. Distribution of Population by Age and Sex. Kenya National Bureau of Statistics.

KNBS (2015). Kenya Demographic and Health Survey 2014. Kenya National Bureau of Statistics and ICF MACRO.

KNBS (2010). Kenya Census Report, 2009. Kenya National Bureau of Statistics and ICF MACRO.

KNBS (2010). Kenya Demographic and Health Survey 2008/09. Kenya National Bureau of Statistics and ICF MACRO.

KNBS (2004). Kenya Demographic and Health Survey 2003. Kenya National Bureau of Statistics and ICF MACRO.

KNBS (1999). Kenya Demographic and Health Survey 1998. Kenya National Bureau of Statistics and ICF MACRO.

KOENIG M., HOSSAIN M. and WHITTAKER M. (1997). The Influence of Quality of Care upon Contraceptive Use in Rural Bangladesh. *Studies in Family Planning* 28 (4):278-89.

KUNGU M. (2001). Analysis of Contraceptive Discontinuation in Kenya: Evidence from KDHS 1998. M.A Thesis. University of Nairobi. Online.

KUNGU W., KHASAKHALA A. and AGWANDA A. (2020a). Trends and factors associated with long-acting reversible contraception in Kenya. F1000Research 9:382.

KUNGU W., KHASAKHALA A. and AGWANDA A. (2020b). Use of Long-acting reversible contraception among adolescents and young women in Kenya. *PLOS ONE* 15 (11).

LAING J. (1985). Continuation and Effectiveness of Cont4raceptive Practice: A Cross- Sectional Approach. *Studies in Family Planning* 16, (3).

LANDE R. and RICHEY C. (2006). Expanding Services for Injectables. Population Reports, Series K, No. 6, INFO Project, Johns Hopkins Bloomberg School of Public Health, Baltimore MD.

LARSSON C. and STANFORS M., (2014). Women's Education, Empowerment, and Contraceptive Use in Sub Saharan Africa: Findings from Recent Demographic and Health Surveys. *African Population Studies* 28(2).

LARYEA D., ANKOBEAH F., MORHE E., AMOAKO Y. and SPANGENBERG K. (2016). Characteristics and contributory factors for injectable contraceptive usage among women in Kumasi, Ghana. *Contraception and Reproductive Medicine* 1:8

LEI ZW., WU SC., GARCEAU RJ., JIANG S., YANG QZ., WANG WL., VANDER MEULEN TC. (1996). Effect of pre-treatment counselling on discontinuation rates in Chinese women given Depomedroxyprogesterone acetate for contraception. *Contraception* 53(6):357–361.

LUTALO T., GRAY, R., MATHUR S., WAWER, M., GUWATUDDE D., SANTELLI J., NALUGODA F. and MAKUMBI, F. (2015). Desire for Female Sterilization among Women Wishing to Limit Births in Rural Rakai, Uganda. *Contraception* (92): 482-487.

MAGADI M. and CURTIS S. (2003). Trends and Determinants of Contraceptive Method Choice in Kenya Author(s): *Studies in Family Planning* 34 (3), 149-159. Population Council.

MAGADI M., ZULU E., EZEH A. and CURTIS S. (2001). Contraceptive Use Dynamics in Kenya. Macro International Inc, Calverton, Maryland USA.

MAHMOOD A. and NAZ S. (2012) Contraceptive use dynamics in Pakistan 2008-2009. Population Council, Islamabad.

MAHUMUD R., HOSSAIN M G., SARKER A., ISLAM M., HOSSAIN M R., SAW A and KHAN J. (2015). Prevalence and Associated Factors of Contraceptive Discontinuation and Switching among Bangladeshi Married Women of Reproductive Age. *Journal of Contraception 6:13-19.*

MANN GLOBAL HEALTH (2017). The Condom Program Pathway. Bill and Melinda Gates Foundation.

MANNAN R. (2002). Factors in Contraceptive Method Choice in Bangladesh: Goals, Competence, Evaluation and Access. *Contraception* 65: 357–364.

MARSTON C., RENEDO A., NYAABA G., MACHIYAMA K., TAPSOBA P. and CLELAND J. (2017). Improving the Measurement of Fertility Regulation Practices: Findings from Qualitative Research in Ghana. *International Perspectives on Sexual and Reproductive Health* 43(3): 111-119.

MEGHA S., SUBHAM., OBY N. and AKASH S. (2014). Determinants of Intrauterine Contraceptive Device Discontinuation among Indian Women. *The Journal of Obstetrics and Gynaecology of India* 64(3):208–211,

MELISSA R., WESTON B., SUMMER L., NEUSTADT A. and GILLIAM M. (2012). Factors Influencing Uptake of Intrauterine Devices among Postpartum Adolescents: A Qualitative Study. American Journal of Obstetrics & Gynaecology206 (1): PMC,

MITCHEL J. and THISTLE P. (2004). Acceptability of Levonorgestrel subdermal Implants versus tubal ligation for long-term contraception in a rural population of Zimbabwe. *Contraception.70 (6)* 483-486.

MOBOLAJI J., BAMIWUYE S. and BISIRIYU L. (2016). Contraceptive discontinuation among Nigerian women: Exploring the ethnic variations. Ife Research Publications in Geography. 14

MoH (2017). National Family Planning Costed Implementation Plan 2017-2020. Ministry of Health, Kenya.

MoH (2016). National Family Planning Guidelines for Service Providers. Ministry of Health, Kenya.

MoH (2012). National Family Planning Costed Implementation Plan 2012-2016. Ministry of Health, Kenya.

MoH, APHRC and IPAS (2018). The costs of treating unsafe abortion complications in public health facilities in Kenya. Nairobi, Ministry of Health, African Population and Health Research Center, Kenya.

MOREAU C., BUOYER J., BAJOS J., RODRIGUEZ G. and TRUSSEL J. (2009). Frequency of Discontinuation of Contraceptive Use: Results from a French Population-Based Cohort. *Human Reproduction*, 1(1): 1–6.

MOREAU C., TRUSSEL J., RODRIGUEZ G., BAJOS J. and BUOYER J. (2007). Contraceptive Failure Rates in France: Results from a Population-Based Survey. *Human Reproduction* 22 (9).

MUMAH J., KABIRU C., MUKIIRA C., BRINTON J. et al. (2014). Unintended Pregnancies in Kenya: A Country Profile. Strengthening Evidence for Programming on Unintended Pregnancy. African Population and Health Research Center and Population Council (APHRC).

MURPHY E. and STEELE C. (2000). Client-Provider Interactions in Family Planning Services: Guidance from Research and Program Experience. Washington, DC: Maximizing Access and Quality Initiative (MAQ); 2000. MAQ Papers, 12. Available at: www.maqweb.org/maqdoc/vol2.pdf.

NEW, J., CAHILL, N., STOVER, J. and ALKEMA, L. (2017). Levels and Trends in Contraceptive Prevalence, Unmet Need, and Demand for Family Planning for 29 States and Union Territories in India: A Modelling Study Using the Family Planning Estimation Tool. *The Lancet Global Health.* 5: 350-358.

NEYMAN J. (2001). In FIENBERG S. and TANUR J. Statisticians of the Centuries.

NGO T., NUCCIO O., PEREIRA S., FOOTMAN K. and REISS K. (2017). Evaluating a LARC Expansion Program in 14 Sub-Saharan African Countries: A Service Delivery Model for Meeting FP2020 Goals. *Maternal Child Health Journal* 21:1734–1743.

NCPD (2019). Kenya Health Service Delivery Indicator Survey 2018 Report. The World Bank, National Council for Population and Development, United Nations Population Fund.

NCPD (2015a). National Adolescent and Youth Survey. National Council for Population and Development, Kenya.

NCPD (2015b). Research Agenda on Population and Development in Kenya. National Council for Population and Development, Kenya.

NCPD (2013). Kenya Population Situation Analysis. National Council for Population and Development.

NCPD (2012a). Population Policy for National Development. National Council for Population and Development.

NCPD (2012b). Regional Variations in Contraceptive Use in Kenya: How Can the Gaps Be Bridged? National Council for Population and Development Policy Brief no. 28.

NCPD (2011). Kenya Service Provision Assessment Survey 2010 (SPA) National Council for Population and Development and Ministry of Health.

NCPD (2000). Kenya Service Provision Assessment Survey 1999 (SPA) National Council for Population and Development and Ministry of Health.

NCPD (1986). Contraceptive Discontinuation Survey. National Council for Population and Development.

NOGUCHI L., RICHARDSON B., BAETEN J and HILLIER S (2015). Risk of HIV-1 acquisition among women who use different types of injectable progestin contraception in South Africa: a prospective cohort study. *Lancet HIV* 2(7): e279-e287.

NONVIGNON J. and NOVIGNON J. (2014). Trend and Determinants of Contraceptive Use among Women of Reproductive Age in Ghana. *African Population Studies* 28(2) Supplement 956-967.

NOUHJAH S., AMIRI E ., KHODAI A., YAZDANPANAH A. and BAGHU M. (2013). Popular Contraceptive Methods in Women Aged 35 Years and Older Attending Health Centers of 4 Cities in Khuzestan Province, Iran. Iranian Red Crescent Medical Journal 15(10).

OBARE, F., BIRUNGI, H., CHI-CHI U., WANJIRU, M., LIAMBILA W. and ASKEW, I. (2011). Levels, Trends and Determinants of Contraceptive Use among Adolescent Girls in Kenya. Population Council. Aphia II Operations Research Project/ Population Council.

OCHAKO, R., IZUGBARA, C., OKAL, J., ASKEW TEMMERMAN, and M., I (2016). Contraceptive Method Choice among Women in Slum and Non-Slum Communities in Nairobi, Kenya. *BMC Women's Health* 16: 35

ODHIAMBO O. (1997). Men's Participation in Family Planning in Kenya. *Population Studies.* 51.

OKECH T., WAWIRE N. and MBURU T. (2011). Contraceptive Use among Women of Reproductive Age in Kenya's City Slums. *International Journal of Business and Social Science* 2(1)

O'FALLON J and SPEIZER I (2011). What Differentiates Method Stoppers from Switchers? Contraceptive Discontinuation and Switching among Honduran Women. *International Perspectives on Sexual and Reproductive Health 37(1):16–23*

O'FALLON B., JANINE L., SPEIZER I. and WHITE J. (2008). Association between Contraceptive Discontinuation and Pregnancy Intentions in Guatemala. *American Journal of Public Health* 23(6).

OMWANDA L. (1996). Communication, Culture and Reproduction: Analysis of Contraceptive Adoption in Kenya. Ph.D. Thesis, University of Western Ontario, London.

ONSONGO F. (1988). An Analysis of Contraceptive Continuation in Kenya. M.A Thesis, PSRI, UON. Unpublished.

ONTIRI S., WERE V., KABUE M., BLANCO R., STEKELENBURG J. (2020). Patterns and determinants of modern contraceptive discontinuation among women of reproductive age: Analysis of Kenya Demographic Health Surveys, 2003–2014. *PLOS ONE* 15(11): e0241605.https://doi.org/10.1371/journal.pone.0241605

PALAMULENI M. (2013*).* Socio-Economic and Demographic Factors Affecting Contraceptive use in Malawi *African Journal Reproductive Health 17(3): 91-104*

PARR N. (2003). Discontinuation of Contraceptive Use in Ghana. *Journal of Health, Population and Nutrition* 21(2)*:*150-157

PATEL, D., KOENIG M., PATEL A., MEHTA A. and RANI M. (1999). The Effects of Service Quality on IUD Continuation among Women in Rural Gujarat, in Improving Quality of Care in India's Family Welfare Programme: The Challenge Ahead, Eds. Koenig M and Khan M. Population Council, New York.

PHILLIPS, J. and BAWAH A. (2005). Achieving success with community health services: the design, impact and utilization of the Navrongo Experiment in Ghana, unpublished paper presented at USAID, Washington DC, 2005.

PICAVET C., VAN DER LEEST L, WIJSEN C. (2011). Contraceptive decision-making: Background and outcomes of contraceptive methods. Rutgers WPF.

PMA2020 (2017). Indicator Brief, Kenya 2017. Available at http://pma2020.org/fp-briefs.

POLIS C.,, PHILLIPS S.,, CURTIS K.,, WESTREICH D.,' STEYN P.,, RAYMOND E, HANNAFORD P. and TURNER A. (2014). Hormonal contraceptive methods and risk of HIV acquisition in women: a systematic review of epidemiological evidence. *Contraception* (4): 360-390.

PSI. (2015). Increasing LARC uptake in Kenya through Improved Demand Creation Strategies and Provider Support. Best Practices from the Women's Health Project 2009-2014. Population Services International.

PURI M., HENDERSON J., HARPER C., BLUM M., JOSHI D and ROCCA C. (2015). Contraceptive Discontinuation and Pregnancy Post Abortion in Nepal. A Longitudinal Cohort Study. *Contraception* 91 (4): 301-7

RAINE T., FOSTER-ROSALES A., UPADHYAY U., BOYER C., BROWN B., SOKOLOFF A. and HARPER C. (2011). One-Year Contraceptive Continuation and Pregnancy in Adolescent Girls and Women Initiating Hormonal Contraceptives *Obstetrics and Gynaecology* 117:363-371.

RAHNAMA P. (2010). Withdrawal Users' Experiences of and Attitudes to Contraceptive Methods: A Study from eastern District of Tehran, Iran. *BMC Public Health* 10:779.

RAMARAO S. and ANAM R. (2003). The Quality of Family Planning programs: Concepts, Measurements, Interventions and Effects. *Studies in Family Planning* 34(4): 227-248.

RAMSTROM K., BARON A., CRANE L. and SHLAY J. (2002). Predictors of Contraceptive Discontinuation in a Sexually Transmitted Disease Clinic Population. *Perspectives on Sexual and Reproductive Health* 34(3)146-152.

RIZVI F. and IRFAN G. (2012). Reasons for Discontinuation of Contraceptive Methods among Couples with Different Family Size and Educational Status. *Journal of Ayub Medical College Abbottabad; 24*(1)

ROCCA C., HARPER C. and RAINE-BENNETT T. (2013). Young Women's Perceptions of the Benefits of Childbearing: Associations with Contraceptive Use and Pregnancy *Perspectives on Sexual and Reproductive Health, 45(1):23–32.*

ROSS J., KEESBURY J. and HARDEE K. (2015). Trends in the Contraceptive Method Mix in Low- and Middle-Income Countries: Analysis Using a New Average Deviation Measure. *Global Health: Science and Practice* 3(1).

ROSS J., HARDEE K., MUMFORD E and EID S. (2001). Contraceptive Method Choice in Developing Countries. *International Family Planning Perspectives* 28(1):32–40.

ROSSIER C., LERIDON H. and THE COCON GROUP. (2004). The pill and the condom, substitution or association? An analysis of contraceptive histories of young women in France, 1978 – 2000. *Population* 59 (3-4):387-414.

SABATES R., GORDON C., BOND R. and WUBSHET T. (2011). Women's Education and Modern Contraceptive Use in Ethiopia. *International Journal of Education* 3(1).

SAFARI W., URASSA M., MTENGA B., CHANGALUCHA J., CHURCH K., ZABA B. and TODD J. (2019). Contraceptive use and discontinuation among women in rural North-West Tanzania. *Contraception and Reproductive Medicine* 4(18).

SALHAN S. and TRIPATHI V. (2004). Factors Influencing Discontinuation of Intrauterine Contraceptive Devices: An Assessment in the Indian Context. *The European Journal of Contraception and Reproductive Health Care* 9:245–259.

SANGI-HAGHPEYKAR H., POSNER S. and POINDEXTER A. (2005). Consistency of Condom Use among Low Income Hormonal Contraceptive Users. *Perspectives on Sexual and Reproductive Health.* 37,184-191.

SHAH N., SHAH A., CHOWDHURY I. and. MENON I. (2007). Reasons and Correlates of Contraceptive Discontinuation in Kuwait. *The European Journal of Contraception and Reproductive Health Care.* 12(3):260–268

SHOUPE D. (2016). LARC Methods: Entering a new age of contraception and reproductive health. Contraception and Reproductive Medicine 1(4).

SKOGSDAL Y., KARLSSON J., CAO Y., FADL H., TYDEN T. (2018) Contraceptive Use and Reproductive intentions among women requesting Contraceptive Counselling. *Acta Obstetricia et Gynecologica Scandinavica* 97:1349-1357.

SOLANKE L. (2017). Factors Influencing Contraceptive Use and Non-Use among Women of Advanced Reproductive Age in Nigeria. *Journal of Health, Population and Nutrition* 36(1).

SONFIELD A., HASSTEDT K., KAVANAUGH M. and ANDERSON A. (2013). The Social and Economic Benefits of Women's Ability to Determine Whether and When to Have Children. Guttmacher Institute.

SPEIZER I., CORROON M., CALHOUN L., LANCE P., MONTANA L., NANDA P. and GUILKEY D. (2014). *Global Health: Science and Practice* 2 (4).

STEELE F. and CURTIS S. (2003). Appropriate Methods for Analysing the Effect of Method Choice on Contraceptive Discontinuation. *Demography* 40 (1):1

STEELE F., CURTIS S. and CHOE M. (1999). The Impact of Family Planning Service Provision on Contraceptive Use Dynamics in Morocco. *Studies in Family Planning* 30 (1).

STEP UP (2014). Reduce Contraceptive Discontinuation in Bangladesh by Improving Contraceptive Counselling on Side Effects. Strengthening Evidence for Programming on UNINTENDED PREGNANCY. Policy Brief.

STRICKLER J., MAGNANI J., MCCANN G., BROWN F. and RICE C. (1997). The reliability of reporting of contraceptive behaviour in DHS calendar data: evidence from Morocco. *Studies in Family Planning* 28:44-53.

The ACQUIRE Project/Engender Health. (2006). Revitalizing the IUD in Kenya. Acquiring Knowledge 2006 (2).

TIBAIJUKA L., ODONGO R., WELIKHE E., MUKISA W., KUGONZA L., BUSINGYE I, et al. Factors influencing use of long-acting versus short-acting contraceptive methods among reproductive-age women in a resource-limited setting. *BMC Women's Health* 17:25. 2017

TODD C., STIBICH M., LAHER F., MALTA M., BASTOS F., IMBUKI K., SHAFFER D., SINEI S. and GRAY G. (2011). Influence of Culture on Contraceptive Utilization among HIV+ Positive Women in Brazil, Kenya and South Africa. *AIDs Behaviour* 15 (454-468).

TRUSSELL J. (2011). Contraceptive failure in the United States. *Contraception* 83:397‑404.

TSUI A., BROWN W, and QINGFENG LI. (2017). Contraceptive Practice in Sub-Saharan Africa. *Population and Development Review* 43 (Suppl 1)166-191.

TSUI A., MCDONALD-MOSLEY R., BURKE A. (2010). Family planning and the burden of unintended pregnancies. *Epidemiological Review* 32(1):152-174.

ULLAH A. and HUMBLE M. (2006). Determinants of Oral Contraception in Bangladesh. *Reproductive Medicine and Biology* 5: 111–121

UN (2019). Contraceptive Use by Method, 2019. United Nations Department of Economic and Social Affairs, Population Division.

UN (2018). World Contraceptive Use 2018. UN Department of Economic and Social Affairs, Population Division.

UN (2017). World Family Planning 2017 Highlights United Nations Department of Economic and Social Affairs, Population Division.

UN (2015). Trends in Contraceptive Use Worldwide 2015. Department of Economic and Social Affairs, Population Division.

UN (2013). World Contraceptive Use 2013. United Nations Department of Economic and Social Affairs, Population Division.

UN (2011). World Contraceptive Use 2011. United Nations Department of Economic and Social Affairs, Population Division.

UN (2006). Levels and Trends of Contraceptive Use as Assessed in 2002. United Nations Department of Economic and Social Affairs, Population Division.

UN (1983). Manual X. Indirect Techniques for Demographic Estimation. Department of Economic and Social Affairs, Population Division.

UPADHYAY U. (2012). Contraceptive Discontinuation and Repeat Unintended Pregnancy within 1 Year after an Abortion. *Contraception* 85 (1) 56-62.

VAN LITH L., YAHNER M. and BAKAMJIAN L. (2013). Women's growing desire to limit births in sub-Saharan Africa: Meeting the challenge. *Global Health: Science Practice* (1): 97–107.

VAUGHAN B., TRUSSELL J., KOST K., SINGH S. and JONES R. (2008). Discontinuation and Resumption of Contraceptive Use: Results from the 2002 National Survey of Family Growth. *Contraception* 78(4): 271-83.

WERSHLER L. (2016). 'I Wouldn't Recommend It to Anyone": What We Can Learn from Women who have had Bad Experiences with Depo-Provera. Society for Menstrual Cycle Research. Blog Post Aug 24[th.]

WESTHOFF C., HEARTWELL S., EDWARDS S., ZIEMAN M., STUART G., CWIAK C., DAVIS A., ROBILOTTO T., CUSHMAN L. and KALMUSS D. (2007). Oral Contraceptive Discontinuation: Do Side Effects Matter? *American Journal of Obstetrics & Gynaecology* 196 (4):412e1-412e7

WHO (2018). FP and Contraception Factsheet 2018. World Health Organisation.

WHO (2015). Improving Access to Quality Care in Family Planning: Medical Eligibility Criteria for Contraceptive Use. Fifth Edition. World Health Organization.

WHO (2007). Prevention of Mother-to -Child Transmission (PMTCT). Briefing Note. Department of HIV/AIDS. World Health Organization.

WILDEMEERSCH D. (2011). Intrauterine contraceptives that do not fit well contribute to early discontinuation. *The European Journal of Contraception and Reproductive Health* Care, 16:135–141.

ZHANG F., TSUI A. and SUCHINDRAN C. (2000). The Determinants of Contraceptive Discontinuation in Northern India: A Multilevel Analysis of Calendar Data. MEASURE Evaluation.

Appendix 1: Multinomial Regression Results for Determinants of Contraceptive Method Choice

a) 2003 Parameter Estimates

Method used[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Short term	Intercept	1.255	.327	14.702	1	.000			
	[V025=1]	.427	.208	4.225	1	.040	1.533	1.020	2.303
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	5.156	.995	26.871	1	.000	173.421	24.689	1218.177
	[v013r=2.00]	2.383	.208	131.448	1	.000	10.834	7.209	16.282
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-1.059	.308	11.842	1	.001	.347	.190	.634
	[v106r=1.00]	-.282	.179	2.480	1	.115	.754	.531	1.072
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	.660	.226	8.548	1	.003	1.934	1.243	3.010
	[v190r=2.00]	.242	.218	1.240	1	.265	1.274	.832	1.952
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.544	.189	8.249	1	.004	.580	.400	.841
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	-.297	.256	1.346	1	.246	.743	.449	1.228
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.
Long term	Intercept	.171	.407	.177	1	.674			
	[V025=1]	.366	.241	2.306	1	.129	1.442	.899	2.312
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	3.585	1.025	12.229	1	.000	36.040	4.833	268.733
	[v013r=2.00]	1.696	.246	47.636	1	.000	5.454	3.369	8.828
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-2.133	.583	13.369	1	.000	.119	.038	.372
	[v106r=1.00]	-1.157	.222	27.076	1	.000	.315	.203	.486
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	-.297	.318	.870	1	.351	.743	.398	1.387
	[v190r=2.00]	-.500	.303	2.737	1	.098	.606	.335	1.097
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.252	.242	1.084	1	.298	.777	.483	1.249
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	.046	.325	.020	1	.888	1.047	.553	1.981
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Permanent.
b. This parameter is set to zero because it is redundant.

b) 2008/09 Parameter Estimates

Method used[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Short term	Intercept	1.717	.301	32.523	1	.000			
	[V025=1]	.592	.214	7.657	1	.006	1.808	1.189	2.750
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	5.962	1.416	17.725	1	.000	388.503	24.206	6235.346
	[v013r=2.00]	1.905	.163	137.325	1	.000	6.719	4.886	9.240
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-.760	.340	4.993	1	.025	.468	.240	.911
	[v106r=1.00]	-.411	.166	6.134	1	.013	.663	.479	.918
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	.156	.197	.632	1	.427	1.169	.795	1.718
	[v190r=2.00]	.110	.189	.339	1	.560	1.117	.771	1.618
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.813	.186	19.030	1	.000	.444	.308	.639
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	-.154	.217	.507	1	.477	.857	.561	1.310
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.
Long term	Intercept	-.014	.412	.001	1	.973			
	[V025=1]	.623	.259	5.801	1	.016	1.865	1.123	3.098
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	4.040	1.452	7.745	1	.005	56.828	3.303	977.772
	[v013r=2.00]	1.438	.217	43.884	1	.000	4.211	2.752	6.443
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-1.783	.753	5.608	1	.018	.168	.038	.735
	[v106r=1.00]	-1.074	.221	23.652	1	.000	.342	.222	.527
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	-1.053	.349	9.088	1	.003	.349	.176	.692
	[v190r=2.00]	-.322	.276	1.363	1	.243	.725	.422	1.244
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.477	.254	3.531	1	.060	.621	.378	1.021
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	.172	.306	.316	1	.574	1.188	.652	2.163
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Permanent.

c)   2014 Parameter Estimates

Method used[a]		B	Std. Error	Wald	df	Sig.	Exp(B)	95% Confidence Interval for Exp(B)	
								Lower Bound	Upper Bound
Short term	Intercept	1.909	.157	148.065	1	.000			
	[V025=1]	.251	.103	5.904	1	.015	1.286	1.050	1.574
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	5.273	.631	69.907	1	.000	194.933	56.637	670.919
	[v013r=2.00]	2.090	.106	386.938	1	.000	8.082	6.563	9.953
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-.724	.216	11.251	1	.001	.485	.317	.740
	[v106r=1.00]	-.501	.100	25.027	1	.000	.606	.498	.737
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	-.066	.113	.338	1	.561	.936	.750	1.169
	[v190r=2.00]	-.150	.113	1.742	1	.187	.861	.689	1.075
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.224	.086	6.776	1	.009	.799	.675	.946
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	-.042	.118	.126	1	.722	.959	.761	1.208
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.
Long term	Intercept	.628	.168	14.049	1	.000			
	[V025=1]	.508	.109	21.875	1	.000	1.662	1.343	2.057
	[V025=2]	0[b]	.	.	0	.	.	.	.
	[v013r=1.00]	4.838	.632	58.515	1	.000	126.178	36.531	435.811
	[v013r=2.00]	2.053	.112	338.424	1	.000	7.788	6.258	9.692
	[v013r=3.00]	0[b]	.	.	0	.	.	.	.
	[v106r=.00]	-.707	.237	8.916	1	.003	.493	.310	.784
	[v106r=1.00]	-.544	.105	26.852	1	.000	.580	.473	.713
	[v106r=2.00]	0[b]	.	.	0	.	.	.	.
	[v190r=1.00]	-.288	.121	5.624	1	.018	.750	.591	.951
	[v190r=2.00]	-.296	.121	5.939	1	.015	.744	.587	.944
	[v190r=3.00]	0[b]	.	.	0	.	.	.	.
	[v024r=1.00]	-.020	.091	.050	1	.823	.980	.819	1.172
	[v024r=2.00]	0[b]	.	.	0	.	.	.	.
	[v501r=1.00]	.211	.126	2.814	1	.093	1.235	.965	1.579
	[v501r=2.00]	0[b]	.	.	0	.	.	.	.

a. The reference category is: Permanent.
b. This parameter is set to zero because it is redundant.

Appendix 2: Full 36 Months Cox Regression Results for Determinants of Discontinuation

	B	SE	Wald	df	Sig.	Exp(B)	95.0% CI for Exp(B)	
Variables in the Equation							Lower	Upper
V190r			.573	2	.751			
V190r(1)	.032	.072	.198	1	.657	1.033	.896	1.190
V190r(2)	-.022	.071	.099	1	.753	.978	.852	1.123
v101r	.020	.059	.118	1	.732	1.020	.909	1.146
v106r			.098	2	.952			
v106r(1)	-.004	.060	.003	1	.953	.997	.886	1.121
v106r(2)	-.029	.092	.097	1	.756	.972	.811	1.164
v013r			10.225	2	.006			
v013r(1)	.198	.079	6.253	1	.012	1.219	1.044	1.424
v013r(2)	.016	.072	.049	1	.824	1.016	.883	1.169
V102	.037	.059	.392	1	.531	1.038	.924	1.165
methodisc			28.815	3	.000			
methodisc(1)	-.386	.234	2.718	1	.099	.680	.429	1.076
methodisc(2)	-.213	.057	13.814	1	.000	.808	.722	.904
methodisc(3)	-.537	.113	22.462	1	.000	.585	.468	.730

Covariate Means	
	Mean
V190r(1)	.233
V190r(2)	.457
v101r	.291
v106r(1)	.306
v106r(2)	.104
v013r(1)	.287
v013r(2)	.535
V102	.577
Methodisc(1)	.013
methodisc(2)	.572
methodisc(3)	.064

Appendix 3: Demographic and Health Survey Contraceptive Calendar

DHS-7 Contraceptive Calendar

INSTRUCTIONS:
ONLY ONE CODE SHOULD APPEAR IN ANY BOX.
COLUMN 1 REQUIRES A CODE IN EVERY MONTH.

CODES FOR EACH COLUMN:

COLUMN 1 BIRTHS, PREGNANCIES, CONTRACEPTIVE USE (2)

- B BIRTHS
- P PREGNANCIES
- T TERMINATIONS

- 0 NO METHOD

- 1 FEMALE STERILIZATION
- 2 MALE STERILIZATION
- 3 IUD
- 4 INJECTABLES
- 5 IMPLANTS
- 6 PILL
- 7 CONDOM
- 8 FEMALE CONDOM
- 9 EMERGENCY CONTRACEPTION
- J STANDARD DAYS METHOD
- K LACTATIONAL AMENORRHEA METHOD
- L RHYTHM METHOD

- M WITHDRAWAL
- X OTHER MODERN METHOD
- Y OTHER TRADITIONAL METHOD

COLUMN 2 DISCONTINUATION OF CONTRACEPTIVE USE

- 0 INFREQUENT SEX/HUSBAND AWAY
- 1 BECAME PREGNANT WHILE USING
- 2 WANTED TO BECOME PREGNANT
- 3 HUSBAND/PARTNER DISAPPROVED
- 4 WANTED MORE EFFECTIVE METHOD
- 5 SIDE EFFECTS/HEALTH CONCERNS

- 6 LACK OF ACCESS/TOO FAR
- 7 COSTS TOO MUCH
- 8 INCONVENIENT TO USE
- F UP TO GOD/FATALISTIC
- A DIFFICULT TO GET PREGNANT/MENOPAUSAL
- D MARITAL DISSOLUTION/SEPARATION
- X OTHER

_____
(SPECIFY)

- Z DON'T KNOW

(1) Year of fieldwork is assumed to be 2015. For fieldwork beginning in 2016, all references to calendar years should be increased by one; for example, 2009 should be changed to 2010, 2010 should be changed to 2011, 2011 should be changed to 2012, and similarly for all years throughout the questionnaire

(2) Response categories may be added for other methods, including fertility awareness methods.

			COL. 1	COL. 2	
2 0 1 5 (1)	12 DEC	01			2 0 1 5
	11 NOV	02			
	10 OCT	03			
	09 SEP	04			
	08 AUG	05			
	07 JUL	06			
	06 JUN	07			
	05 MAY	08			
	04 APR	09			
	03 MAR	10			
	02 FEB	11			
	01 JAN	12			
2 0 1 4	12 DEC	13			2 0 1 4
	11 NOV	14			
	10 OCT	15			
	09 SEP	16			
	08 AUG	17			
	07 JUL	18			
	06 JUN	19			
	05 MAY	20			
	04 APR	21			
	03 MAR	22			
	02 FEB	23			
	01 JAN	24			
2 0 1 3	12 DEC	25			2 0 1 3
	11 NOV	26			
	10 OCT	27			
	09 SEP	28			
	08 AUG	29			
	07 JUL	30			
	06 JUN	31			
	05 MAY	32			
	04 APR	33			
	03 MAR	34			
	02 FEB	35			
	01 JAN	36			
2 0 1 2	12 DEC	37			2 0 1 2
	11 NOV	38			
	10 OCT	39			
	09 SEP	40			
	08 AUG	41			
	07 JUL	42			
	06 JUN	43			
	05 MAY	44			
	04 APR	45			
	03 MAR	46			
	02 FEB	47			
	01 JAN	48			
2 0 1 1	12 DEC	49			2 0 1 1
	11 NOV	50			
	10 OCT	51			
	09 SEP	52			
	08 AUG	53			
	07 JUL	54			
	06 JUN	55			
	05 MAY	56			
	04 APR	57			
	03 MAR	58			
	02 FEB	59			
	01 JAN	60			
2 0 1 0	12 DEC	61			2 0 1 0
	11 NOV	62			
	10 OCT	63			
	09 SEP	64			
	08 AUG	65			
	07 JUL	66			
	06 JUN	67			
	05 MAY	68			
	04 APR	69			
	03 MAR	70			
	02 FEB	71			
	01 JAN	72			

Appendix 4 List of Discontinuation Variables Created for the Study

- EV900 – Date episode begins in century months (CMC)
- EV901 – Date episode ends in CMC
- EV901A – Duration of episode
- EV902A – Specific episode code
- EV903A – Specific discontinuation type code
- EV906A – Marital status at the end of episode
- EV902 – Episode code (numeric)
- EV903 –Discontinuation code (numeric)
- EV904 –Prior episode code
- EV904X –Duration of prior episode
- EV905 – Next episode code
- EV905X – Duration of next episode
- TYPEDISC – Type of discontinuation
- METHODISC – Method discontinued